PC-ONLINE Program

Summary

1. Aim of program

Although REI2's software can satisfy timing requirements in most cases, on particular occasions it may be necessary to use an electronic processor for the management of particular events or tests. This is the situation in which to use the PC-ONLINE program, which makes it possible to use the accurate time base of REI2 and the great number of input channels (lines, LinkGate, LinkPod) together with the particular features of the program created for the processor.

Using this program, REI2 will send the processor a string containing information about the channel on which the event has been acquired, the time of day of the event and, if necessary, the competitor number to which it has been assigned. REI2 keeps a copy of all the events acquired in its internal memory.

2. Conventions

In this manual the keys to be pressed are shown inside angled brackets. For example, press **<F1>** means the yellow key marked F1, while the options proposed by REI2 are indicated in bold type.

A time which is shown in *italics* on the display indicates that this time is running on the stopwatch.

An underlined figure indicates that the blinking cursor is in that position and the stopwatch is waiting for an input.

3. Starting

3.1. Introduction

The best way to learn to use Microgate's REI2 stopwatch is to begin trying. Bear in mind that there is no sequence of keys which can damage your stopwatch. However, make sure you read this manual carefully before connecting any accessories.

4. Program characteristics

REI2 stores all the events (**START**, **LAP**, **STOP**)) and allows you to make all the modifications that may become necessary at any time.

There are three possible configurations: 'Standard', 'Competitor number assignment' and 'Vintage cars'. All the data about acquired events are immediately sent on the serial line. At the moment in which, with competitor number assignment activated, the competitor number is inserted and confirmed, the item of data is retransmitted with the new information. In the 'Vintage cars' program, REI2 waits for insertion of the competitor number to be assigned to the first event coming from the pressure sensor. Transmission is made for any variation in the data recorded on REI2.

In the 'Vintage cars' program there are no START, LAP or STOP events, but only the event **T,** which means that the event has come from a pressure sensor or photocell and event **M** from a manual impulse (push-button). There can be up to 6 different acquisition stations, the first two of which are managed by means of the external lines or keys, while the others are managed with a LinkPod.

It is possible to retransmit the most recently acquired events, The number of events to be retransmitted can be defined by the user.

On the printed strip all the events recorded are shown with the indication of the type, competitor number, run, channel type, channel and time and all the modifications made to them (annulments, variations, re-assignments…).

Firstly the functions available within the Timing function will be illustrated. Then the possibilities which can be accessed from the program menu will be illustrated.

The various choices possible, both as regards the various menus and options and the various modifiable values are assigned each time by the 5 function keys <**F1**> …<**F5**>.

If not otherwise specified, times are taken with an accuracy of 1/25,000 of a second; they are printed and displayed with an accuracy of 1/10,000. However, time events are sent with an accuracy of 1/10,000.

To meet special requirements, times can be taken and stored at lower levels of accuracy and adjusted to the same level required by the competition (e.g. relay races timed at 1/10).

REI2 does not do any processing of acquired events but only sends the relative information for processing. It is therefore extremely important that the processor is ready to receive the information sent by REI2 if this is to be used for 'real time' management (televising or board display). The information in REI2's memory can in any case be retrieved by using the relevant commands.

The transmission protocol is given in the manual **Transmission protocols**.

The PC-Online program is also suitable for timing races in which there is only a group start, as for example in marathons. This is how it is used:

  − You synchronize the stopwatch with the race start

– The impulse for every athlete who passes is acquired. You assign it to the competitor number and the net time is sent to the computer.

– If you do not manage to insert the competitor number in time, it can be assigned later.

It is also possible to display the time of day on the displayboard (which in the previous example is the time of the race). If a uTab is used, on the displayboard set the line to 0. If you use a uGraph, set the line to 1.

This manual refers to software version 1.07.9.

5. Timing

5.1. Functional context

The various functions are assigned with the 5 function keys in different ways depending on the events to be managed and according to whether a request has been made to operate on the competitor number to which the acquired event 'belongs'.

In the first sessions you are therefore advised to check the functions associated with the different keys, which are always shown on the display, before pressing them.

The various functions which are active within the various 'statuses' in which REI2 can find itself are shown below, together with the section in which their use is described. The letters in brackets mean that the function is available in **with ass.competitor** configuration **(A), standard (S)**, **Vintage car race** (**O**) or all three (**S,A,O**). The description below refers to the **with ass.competitor** configuration. If the function is not available in **Standard** configuration, it is indicated by **(A)** in the heading. The description of the **Vintage car race** is in chap. 6 Vintage car race on p.19.

Statuses:
- **Normal (S,A,O)**   there are no events to manage or events to confirm/modify
- **Confirm event (S,A,O)**: an event has been acquired and REI2 is waiting for confirmation
- **Modify event (A,O)**   it has been decided to operate on the stored events.

The functions active in 'normal' status are:

The functions active in 'Confirm event' status are:

The functions active in 'modify event' are:

5.2. Start of session

To begin a timing session (race), after you have chosen the option for the race a request appears asking you to select the program required.

This manual illustrates the functioning of the 'PC-ONLINE' program, so press key **<F5> Other** to access the second part of the list of programs available and then **<F3>** for **PC-ONLINE**.

If a previously used configuration is stored and you intend to use it (automatisms, truncations, holdoff times…), press **<F2>** for **Retain configuration of last race**.

If, on the other hand, you wish to change the configuration used, press **<F1>** for **Delete previous configuration**. To confirm that you wish to annul the set configuration, press **<F4>** for **Yes** and the function key corresponding to the new configuration to be used; in case of error, press **<F5>** for **No**.

To select the **'With bib ass.'** mode press the **<F2>** key.

Then to activate the session, press **<F1>** for **Timing**.

5.3. Display

5.3.1. During event acquisition


```
A              B        C          D

 10:12:34.5   ST0 LP0 SP0 AX0     ~
  21      5  01:22:34.1042 START
  22     55  01:22:38.6656 STOP    Mem.
  23     25  01:23:09.5298 LAP   1
  24  -----  01:42:10:5411 START

  25-----
 Edit   Rep.Trans. Ann.Ev    Menu

 E   F   G        H        I           J
```
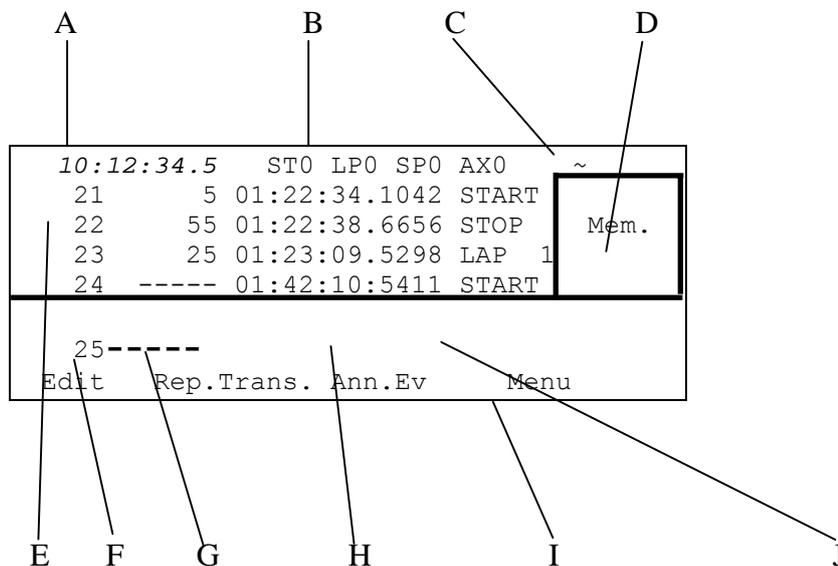
Figure 1

In the various positions we can see:
a) Running time of day
b) Status of the lines
c) Power status
d) The number of start impulses in the memory
e) The last 4 events already managed
f) The consecutive number of the next event
g) Space for the assignment of the competitor number
h) Time event

i) The options which can be activated with the function keys
j) Area for last event acquired.

5.3.2. During event correction (A)

```
            A


  10:12:34.5

 EV.N BIB N.        TIME         EVENT

    4      55 00:34:38.50_78 START


  Search Ann.Ev. Today C. C.Event   QUIT


   B        C        D           E
```
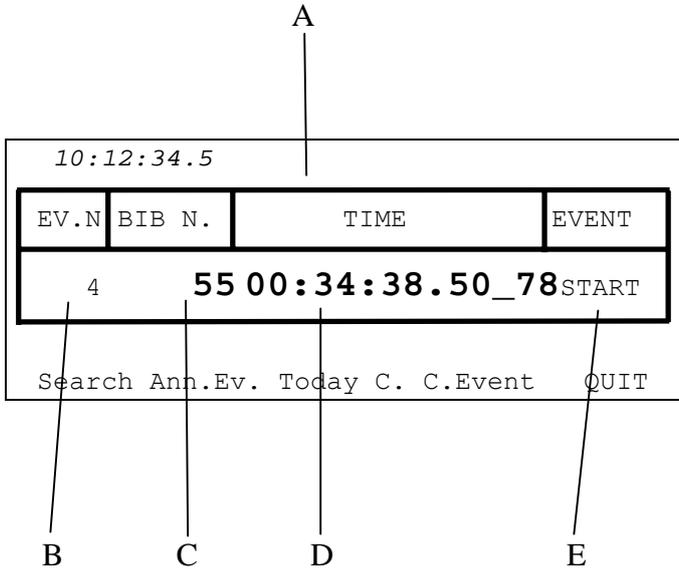
Figure 2

In the various positions we can see:
a) Field description
b) Consecutive event number
c) Possible competitor number assigned
d) Event time of day
e) Type of event

5.4. Event acquisition

REI2 listens out for an event on the various input lines. The display has the features shown in 5.3.1 During event acquisition (on p.11). When an event is acquired, the relative data is shown on the display and the relative string is sent on the serial port. At the same time a printout is made of the relative time.

```
  10:12:34.5   ST0 LP0 SP0 AX0     ~
                                      Mem.



   1----- 10:12:34.58_74  START
 Edit   Rep.Trans.  Ann.Ev        Menu
```
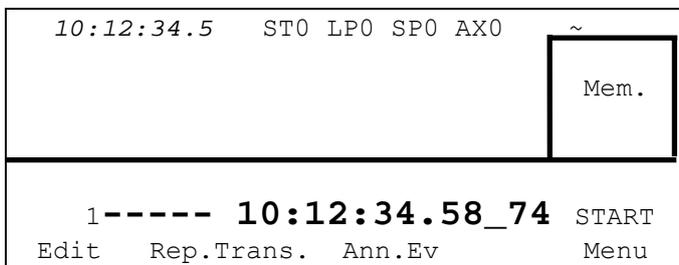
The data remains available for immediate correction for 6 seconds (modifiable by the user see chap. 11.1.2 Confirm time on p.30), after which it is considered as 'accepted' and inserted in the list of the most recent events acquired. The data can be confirmed before 6 seconds are over by pressing <ENT>. When automatic confirmation (6") or manual confirmation (<ENT>) takes place, no string is retransmitted.

Any events acquired while the stopwatch is waiting for confirmation of the previous event are queued up in a dedicated memory and the number of these events is shown in the square on the right under the indication **Mem.**.

```
 10:12:34.5    ST0 LP0 SP0 AX0      ~
                                  ┌─────┐
                                  │ Mem.│
                                  │     │
    1  ----- 10:12:34.5874 START  │     │
 ─────────────────────────────────┘
    2 ─ ─ ─ ─
 Edit    Rep.Trans.              Menu
```
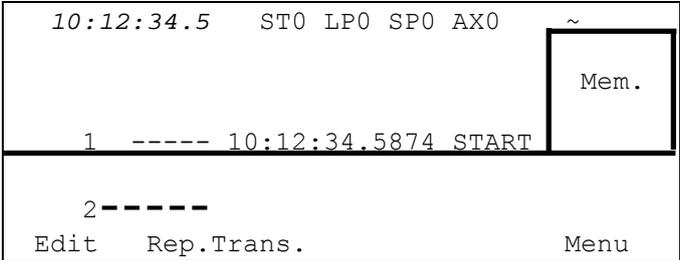
5.4.1. Assigning a competitor number (A)

During the 6 seconds which pass between acquisition of an event and its automatic confirmation, it is possible to insert the competitor number to which the event 'belongs'. To do this you need only key in the number and press **<ENT>** to confirm. Pressing a number blocks the count for automatic confirmation. If an error is made while keying in a number, the figures inserted can be deleted by briefly pressing the **<ESC>** key.

Prolonged pressing on the **<ESC>** key deletes all of the inserted number and confirms the event without a number. The data for a time event to which a 'proprietary' number has been assigned is retransmitted, accompanied by its competitor number, as soon as **<ENT>** is pressed.

```
 10:12:34.5    ST0 LP0 SP0 AX0      ~
                                  ┌─────┐
                                  │ Mem │
                                  │     │
                                  │     │
    1─289 10:12:34.58_74 START
 Edit    Rep.Trans. Ann.Ev        Menu
```

```
 10:12:34.5    ST0 LP0 SP0 AX0      ~
                                  ┌─────┐
                                  │ Mem │
                                  │     │
    1  --289 10:12:34.5874 START  │     │
 ─────────────────────────────────┘
    2 ─ ─ ─ ─
 Edit    Rep.Trans.              Menu
```
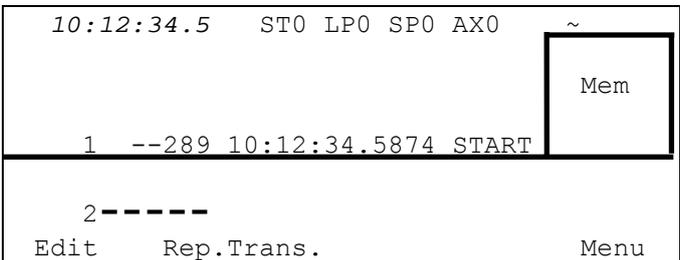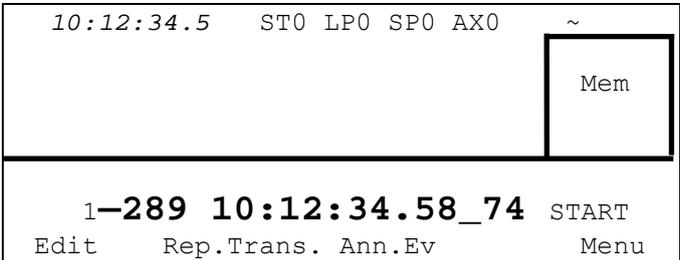
It is possible to pre-set a competitor number by keying in the number and confirming it with **<ENT>**. In this way the acquired event will be immediately assigned to the competitor number indicated and the string sent to the processor will also contain the competitor number.

☞ If the event is acquired between the beginning of insertion of the competitor number and confirmation with **<ENT>**, sending of the string on the serial is 'suspended' until the competitor number is confirmed.

☞ By default no check is made on the competitor numbers inserted. A number of events of the same type (e.g. START) can be assigned to the same competitor number without any kind of warning being given. If instead 'Event existence check' is chosen (see chap. 11.1.3 Event existence check on p. 30) it is not possible to assign two identical events to the same competitor number. In this case REI2 indicates the error on the display and stores the event without associating any number with it.

5.4.2.   Generic lap (A)

If an impulse from the logical channel 0 (generic lap) is acquired, REI2 indicates its source with the letters **LAP G** both on the display and on the printed strip. If no competitor number assignment is made within 6 seconds, the event is stored indicated as generic.

If on the other hand a competitor number is assigned to the impulse acquired, the first Lap number not yet assigned to that competitor number is assigned. To modify the lap number proposed, press the key <**F1**> **Mod. Lap** within 6 seconds and after keying in the lap number confirm with <**ENT**>**.**

5.4.3.   Event annulment

If the event acquired is to be considered not valid it can be annulled immediately by pressing the <**F3**> **Ann.Ev** key before the six seconds are over. The data for the annulled event is retransmitted on the serial port with an indication of its annulment and at the same time is reprinted with the indication **'AN'**.

In the area of the display reserved for showing the most recent events acquired the identification 'ANN' is inserted in place of the competitor number.

```
  10:12:34.5    ST0 LP0 SP0 AX0      ~
                                   ┌──────┐
                                   │ Mem. │
                                   │      │
   1    ANN   10:12:34.5874 START  │      │
                                   └──────┘
   2 ─ ─ ─ ─ ─
 Edit    Rep.Trans.            Menu
```

5.4.4.   Transmission repetition

If necessary, it is possible to retransmit the most recent events acquired directly from REI2, without having to make a request from the management program, by pressing the key <**F2**> **Rep.Trans.** The number of events to be retransmitted can be selected by the user with the relevant configuration function. See section 9.2 Record number for retransmission on p.27.

The events are retransmitted in the same form in which they are recorded in the memory of the stopwatch, so for any modified or annulled events, only the modified data or the record with the indication of annulment is transmitted.

5.5.   Modifying stored events (A)

Pressing the <**F1**> **Modify** key takes you from data acquisition mode to data modification mode. Any events acquired while you are in this status are inserted in the queue of events to be managed

and will be reproposed to the operator when he/she returns to 'Event acquisition' status by pressing the **<F5> QUIT** key. The appearance of the display varies as indicated in 5.3.2 During event correction (A) on p.12.

To modify the competitor number assigned to the time event displayed, key in its number and confirm with **<ENT>**. If the time event is annulled (indication **ANN** in the column **Bibs N.**) the setting of a number readmits the event.

To select the event to be modified it is possible to run through the list of events in chronological order, from the oldest to the most recent, by pressing the **<Arrow up>** key, while pressing on the **<Arrow down >** key runs you through the time events from the most recent to the oldest. Keeping the **<Arrow>** key pressed down for a long time allows you to run rapidly through the times.

When you have found the event you want, you can modify the competitor number assigned to it by inserting the number and confirming with **<ENT>**.

5.5.1.   Search (A)

Two search modes are available to simplify the finding of time events to be operated on. The first allows you to select a single event with its consecutive number, the second enables you to limit selection with the arrow keys to only those events with the same competitor number.

- To look for an event with the progressive identification number, press **<F1> Search**, then **<F2> N.Event>**. The cursor places itself under the indication **N.EV**. and waits for insertion of the event number to be searched for.

  When the event number to be searched for has been confirmed, it is shown on the display if present. At this point it is possible to operate on it. The **<Arrow>** keys allow you to scroll forwards or backwards starting from the time event shown.

- To look for the events assigned to a specific competitor number press the **<F1> Search** key and then **<F1> Bib N.**. If a competitor number has been assigned to the event on the display at that moment, it will be used as the competitor number to be searched for. If not, REI2 will place the cursor under the indication **Bib N.** and ask you to key in the competitor number to be searched for (**Insert competitor number**).

  When the search for a specific competitor number has been activated, the message **'N. ------ has been selected'** appears. If no event assigned to the competitor number indicated has been found, for a few seconds the message **'Bib N. ------- is not in the race'** will appear, after which the number to search for will be once more requested.

  When a competitor number has been selected, the **<Arrow>** keys allow you to scroll cyclically forwards or backwards through the events which belong to it.

When you have found the event to be modified, press the **<F5> QUIT**. Key to return to the previous menu.

5.5.2.   Event annulment (A)

If the event acquired is to be considered as not valid it can be annulled by pressing the **<F3> Ann.Ev** key. Confirmation of your intention to annul the event is requested. Press **<F4> Yes** to annul or **<F5> No** if you do not wish to annul. The data for the annulled event is retransmitted on

the serial port with an indication of its annulment and at the same time is reprinted with the indication **'AN'**.

5.5.3. Time event correction (A)

To modify the time of day of an event press the **<F3> C.Chrono** key. The cursor places itself under the indication **TIME** and waits for insertion of the correct value. Confirm each value (hours, minutes ….) with **<ENT>**.

The active function keys are:
- **<F1> C.Data** Allows you to modify acquired data
- **<F2> Reass.** Allows you to assign the same time event to another competitor number. Firstly the competitor number to which the event is to be assigned is requested, and the current number is proposed. When the new number has been confirmed with **<ENT>**, the event type, which can be selected with the **<Arrow>** keys, is requested. After subsequent confirmation with **<ENT>**, you are asked if you wish to delete the original event. If you press **<F4> Yes**, the new data is written over the old event. If you press **<F5> No**, a new record is created with a new progressive number.

5.5.4. Event correction (A)

To modify the event type, press the **<F4> C.Event**. key. The type of event acquired will be shown inside a rectangle. Each time you press the **<Arrow>** keys, the various alternative options (**START, LAP, AUX, STOP**) will be proposed. If a **LAP** type of event is selected, insertion of the relative lap number is requested. When you have specified the event type, confirm the modification with the **<ENT>** key.

5.5.5. Quitting event modification (A)

To quit 'modify events' mode, press the **<F5> QUIT**. Key. Any events acquired during editing will be proposed for management.

5.6. Lock keys

The two **<LCK>** keys have similar function features. The only difference is that, while the **<LCK>** key over the **<Stop>** key operates only on the stop line, the key over the **<Start>** key can be configured in whatever way the user likes (see the section Line exclusion configuration on p.36).

When activated simply by pressing, the red led corresponding to the button pressed begins to blink and the symbol **#** appears in front of the number of impulses in the memory.

All the impulses acquired at the locked line are stored.

Pressing a second time on the LCK key reactivates the line (and turns off the relative led). At this point, if at least one event has been acquired, the message **'Annull.nn events xxx ? Yes No'** appears on the last line of the display, where nn is the number of events acquired and xxx is their type. Reply **Yes** with **<F4>** to delete irreversibly the events acquired. Reply **No** to deal one by one with the events in question, deciding whether to annul them or assign them to an athlete.

If necessary, it is possible to reactivate the lock, once again with the **<LCK>** key, without losing any events. The next time the **<LCK>** key is pressed, you are offered the chance of managing both the events acquired in the previous lock phase and those in this one.

Note that the lock keys act on all the inputs (line, LinkPod ©, radio) assigned to the blocked logical channel but have no effect on the line keys.

5.7.   Holdoff time disactivation keys

The two **<Rearm>** keys have similar function features. The only difference is that, while the **<Rearm>** key over the **<Stop>** key operates only on the stop line, the key over the **<Start>** key can be configured in whatever way the user likes (see section Line exclusion configuration on p.36).

Pressing the key once annuls the waiting time set for the lines on which it is configured. In this way REI2 can be set up to receive impulses without waiting for the end of the holdoff time set (see section 12.2 Holdoff time lines on p.35). Annulment of holdoff time, shown by the blinking of the led on the key, remains active until the **<Rearm>** key is pressed again. Of course, the key has no effect on the holdoff times set on the peripherals (e.g. Polifemo).

5.8.   Quitting timing

To return to the race management menu at the end of the timing session:
- Press the **<F5>** key for **MENU**

It is possible to quit the timing menu, make changes and return to timing also during the race. Of course, all the data is retained.

If some events, for example a STOP, have been acquired, when you return to the timing function the message **'Some events have been acquired. Do you want the events acquired to be deleted?'** appears. To cancel the stored events press the **<F1>** key and then confirm the decision to delete with the **<F4>** key for **Yes.** If you press **<F2>** you will return to timing, with the events ready to be managed.

5.9.   Time event printout

REI2 prints all the events, results and all the operations performed on the printout. All the data is printed on two or more lines. The first line allows you to identify the event or result, the next line or lines give the value or values assigned to them. Every group of lines is separated from the next group by a white line.

5.9.1.   Printing of events

When an event takes place, two lines containing the information about the acquired event are printed.

Let's take a closer look:

```
A  B      C      D         E
|  |      |      |         |

 CR 1      1    Key
    START  10:31:59.74_56


          |         |         |
          F         G         H
```

Identifying line

Value line/lines
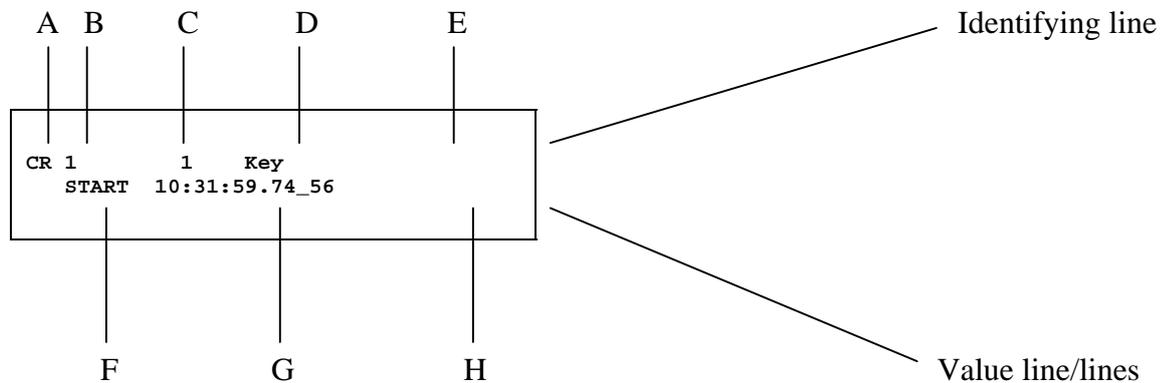
A: Operation identifier. It can adopt one of the following values:
- AN   deletion of time event
- CC   time event correction
- CR   printing of time event for normal event acquisition
- SU   substitution (printed together with deletion when the competitor number of a time event is substituted)
- CR   printing of time event with a competitor number assigned

B: Consecutive event number:
- T he competitor number to which the event refers for all the events assigned

C: Competitor number where assigned

D: Source identifier: channel through which the event shown arrived. It can adopt the following values:
- Key   manual using the Start, Lap, Aux or Stop keys
- Line   received from input lines
- Keyb   inserted using the keyboard, for example, manual insertion of a finish time.
- Radio   received via radio
- Enc   acquired after a time interval through time event transfer from LinkGate Encoder
- Pod **n**   acquired via LinkPod from pod number **n**

E: Change: When the line refers to the change of a previously inserted item of data, the indicator *M* appears on the right of the first line

F: Time event type. It can adopt one of the following values:
- START   start time event (start)
- STOP   stop time event (stop)
- Lap**nnn**   intermediate time event (lap) of lap number **nnn**

G: Significant time. REI2 stores all events internally with the utmost precision (1/25,000 of a second) and presents them to the operator with a precision of 1/10,000 of a second regardless of the precision set.

H: Part of time cut off by rounding up or down. The dash '_' shows the precision set. The values calculated which would be to the right of the dash are not shown or printed in net times.

6. Vintage car race

6.1.   Display(O)

The displays are similar to the 'Assign competitor number' configuration. The differences are pointed out below.

6.1.1.   During event acquisition (O)

```
 10:12:34.5   ST0 LP0 SP0 AX0      ~
   21      5 01:22:34.1042 T
   22  ----- 01:22:38.6656 M      Mem.
   23  ----- 01:23:09.5298 T
   24  ----- 01:42:10:5411 T
   25-----
 Edit   Rep.Trans. Place Synchro  MENU A
```

                    A   B
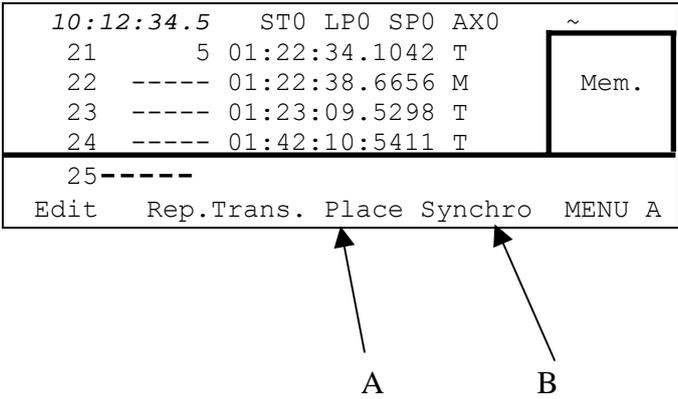
Figure 3

In the various positions we can see:

   A) **Place** to access the acquisition stations menu

   B) **Synchro** to access the synchronization menu

The holdoff times of all the lines can be set by pressing <**ALT**> + <**F1**> (by default 100ms).

6.1.2.   During event correction (O)

```
 10:12:34.5

 EV.N BIB N.       TIME        EVENT

    4      55 00:34:38.50_78 T



 Search Ann.Ev. Today C. C.Event  QUIT
```

                        A
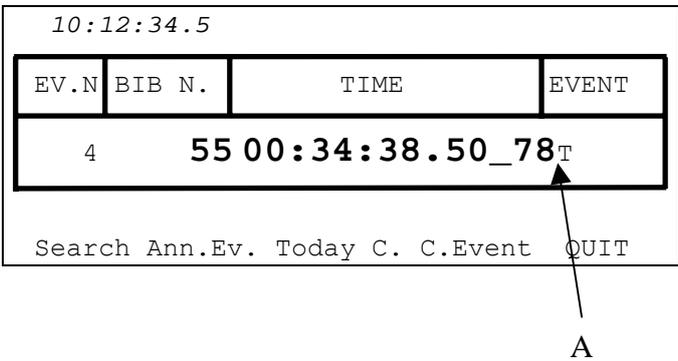
Figure 4

In **A** instead of the **START**, **STOP** or **LAP** event, there is the event **T** which indicates acquisition from a pressure sensor or photocell. The letter **M** is for events which come from a manual impulse.

6.2. Event acquisition (O)

As in the competitor number assignment configuration, when events are acquired REI2 waits for the competitor number to be inserted. Only after this operation does it print the following events.

```
 10:12:34.5   ST0 LP0 SP0 AX0     ~
                                      ┌──────┐
                                      │      │
                                      │ Mem. │
                                      │      │
    1-----  10:12:34.58_74 T        └──────┘
               Ann.Ev.
```

Any events acquired while the stopwatch is waiting for confirmation of the previous event are queued up in a dedicated memory and their number is shown in the square on the right under the indication **Mem.**.

```
 10:12:34.5    ST0 LP0 SP0 AX0     ~
                                      ┌──────┐
    1     1 10:12:34.5874 T          │      │
    2       10:12:34.6753 M          │      │
    3       10:12:34.7012 T          └──────┘
    4-----
 Modify  Rep.Trans.          Menu
```

6.2.1. Assigning a competitor number (O)

After taking the first event acquired by the pressure sensor/photocell it is necessary to enter the 'proprietary' competitor number. To do this you need only key in the number and press **<ENT>** to confirm. If a mistake is made when keying in the number, you can cancel the numbers inserted by briefly pressing the **<ESC>** key.

Prolonged pressing of the **<ESC>** key cancels all the numbers keyed in. The data relating to a time event to which a proprietary number has been assigned are retransmitted together with the competitor number as soon as **<ENT>** is pressed.

It is possible to preset a competitor number by keying in this number and confirming it with **<ENT>**. As a result the first event taken by the pressure sensor/photocell will be immediately assigned to the competitor number indicated and the string sent to the processor will also contain the competitor number.

☞ If the event is taken between the beginning of keying in of the competitor number and confirmation with **<ENT>** the sending of the string on the serial is 'suspended' until the competitor number is confirmed.

If the same event is assigned to the same competitor number more than once, the value for the run automatically increases as there can be more than one transit past the same machine at a station.

6.3. Stations

With the 'Vintage cars' program up to 6 transit stations can be connected. The connections to make are the following:

Station N°	Pressure sensor	Manual
1	START Line START Key	LAP Line LAP Key
2	STOP Line STOP Key	AUX Line AUX Key
3	Pod 0 Line 1	Pod 0 Line 2
4	Pod 0 Line 3	Pod 0 Line 4
5	Pod 0 Line 5	Pod 0 Line 6
6	Pod 0 Line 7	Pod 0 Line 8

If there is a transit at the first station, REI2 waits for insertion of the competitor number before confirming and printing the data. For the other stations, however, the same competitor numbers are reproduced. So if the competitor numbers 12, 14 and 319 pass at the first station, at the second station the competitors will pass in the same order (12, 14 and 319) and so on for the other stations. To display the transit sequences for the various stations, select <Stations> from the menu in 'normal' status. The display will look like this:

```
  10:12:34.5    ST0 LP0 SP0 AX0      ~
Station T2 |    T3  |   T4   |   T5   |  T6
       12 |        |        |        |
       14 |        |        |        |
      319 |        |        |        |
          |        |        |        |
              Delete Quit
```

If you press <**F3**> **Delete** you must select the station from which to eliminate the competitor. With <**F1**> you eliminate the first competitor who must go past station **T2** (who in this case is number 12), with <**F2**> past station **T3** and so on.

Pressing <F5> takes you back to the time-keeping menu.

6.4. Time event printout (O)

REI2 prints all the events and all the operations made on the printed strip. Every time a machine at a station is passed, the times coming from the pressure sensor/photocell and manual acquisition are printed. On the printed strip each transit is separated from the next by a dash -.

6.4.1. Printing of events (O)

For each event that takes place, two lines containing the information for the acquired event are printed.

Let's take a closer look:

```
   A   B      C         D



         M    00:00:25.6780
       12  1  00 00:25.7012
         T    00:00:26.0132
       ----------------------
```
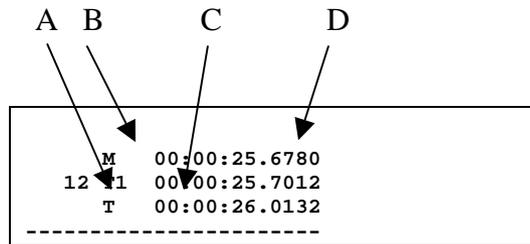
A: Competitor number assigned

B: Event type
- **T** : event coming from pressure sensor/photocell
- **M:** event coming from manual

C: Number of station 1-6

D: Relevant time. REI2 stores all the events internally with the greatest possible precision (1/25,000 of a second) and presents them to the operator with a precision of 1/10,000 of a second whatever the precision set.

7. TimeLink

The TimeLink system must be connected to the port of computer B. Then the TimeLink protocol in the menu Data transmission to PC must be set (see chap. 9.5 Data output protocol on p.27). When the time-keeping menu is entered, REI2 automatically looks for the telephone company and displays the field level. If REI2 does not find the telephone company and there is not enough field, the indication **#Ric#** will appear on the display.

7.1.   Display

The displays are similar to the 'Assign competitor number' configuration. The differences will be pointed out below.

7.1.1.   During event acquisition
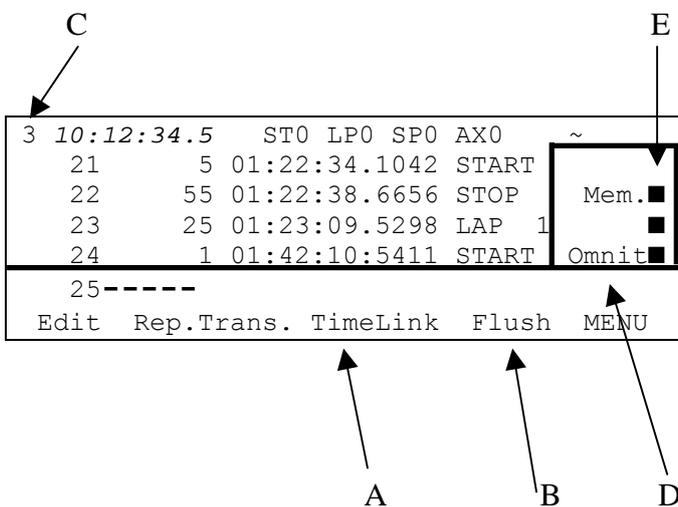
Figure 5

In the various positions we can see:
a) **TimeLink** to access the TimeLink configuration menu
b) **Flush** to send the last data stored and not yet sent
c) **Events indicator** indicating the last data stored and not yet sent
d) **Telephone company** indicating the telephone company connected
e) **Field level** indicating the field level.

7.2.   Event acquisition

REI2 manages events in the same way as in the 'Competitor number assignment' configuration. After five (by default, but which can be set by the user) stored events to which a competitor number has been assigned, the stopwatch sends the data to the TimeLink system. The latter sends an SMS to two telephone numbers. To set these telephone numbers select **TimeLink** in the time-keeping menu, then press <**F1**> to enter the primary telephone number. The backup number can be entered with <**F2**>. With <**F3**> you can set the maximum number of events in the memory which have not yet been sent.

Instead of waiting for the data to be sent automatically, it is possible to carry out this operation manually by pressing <**F4**> **Flush** in the time-keeping menu.

8. Synchronization

REI2 can be synchronized by means of the keyboard, the external line or via radio with the LinkGate system. If necessary, synchronization can be corrected by putting the internal clock forward or back.

8.1.   Synchronization

Through this function, REI2's internal clock is synchronized. The operation is performed by inserting the time of synchronization, confirming each field (hour, minutes, ….) with the **<ENT>** key and then the date.

Attention: to be able to carry out synchronization the start line must be 'at rest' when **<F4>** is pressed (open for line N/O, closed for line N/C). If the line is not 'at rest', the message **'!!!!ATTENTION !!!! START line unable to give synchronization impulse……..'** will appear.

With:
- **<F2>** the inserted data can be modified if a mistake has been
- **<F4>** confirm synchronization data. With the next START impulse, the internal clock starts
- **<F5**> to return to the previous menu.

8.2.   Modify synchronization value

In certain situations it may be necessary to change the synchronization of REI2 to align it with other devices which cannot be resynchronized. After establishing the gap in synchronization between the two devices (for example with a stop in parallel), insert the value as '**Time change**' (paying attention to the alignment; for example, 3 hundredths should be inserted as 3000 ten-thousandths). The date can also be changed. Each value should be confirmed with **<ENT>**.

The enabled function keys are:
- **<F1> Time** + to change the sign of variation; with each press it enables the increase or reduction of values
- **<F3> Correct** to change any incorrectly inserted data
- **<F4> OK** to carry out correction of synchronization
- **<F5> menu** to quit the function.

8.3.   Synchronization verify

Calling up this function makes REI2 ready to receive an impulse from a line (main or LinkPod) or the LinkGate system

The message **SYNCHRONIZATION VERIFY** – **Wait for impulse…** appears on the display. When REI2 receives an impulse, the channel the impulse comes from and the date and time when it was acquired are printed on the printed strip.

8.4. *Signal*

With this function a synchronization impulse for the synchronization of other devices can be generated. When the function is activated, a request is made for the time and date for generation of the impulse. Every value must be confirmed with **<ENT>**.

The signal is generated by switching pin 6 of the I/O digital port to level 0.

9. Download data to PC

When a competition is in progress or at its end the transmission of data to the electronic processors may be requested without the processor itself requesting this. The port to use and the transmission velocity can be specified with the function Serial ports setup (see 11.3 on p. 33)

9.1.   Off-Line data transmission

With this function it is possible to select the data to be sent to the PC and to begin its transmission. All time events which satisfy the required conditions will be sent.

The enabled function keys are:
- **<F1>** Each time you press it, it enables(**Time event limits: activated**) or disables (**Time event limits: disactivated**) the time limits for acquisition of the time events to be retransmitted. In the case of **Limit active** only the time events acquired between the times of day specified as limits will be retransmitted
- **<F2>** Allows you to specify, with the limits **disactivated**, the number of events to be retransmitted
- **<F2>** With the limits active, it allows you to specify the lower limit
- **<F3>** With the limits active, it allows you to specify the upper limit
- **<F5> quit:** to return to the previous menu.

To start transmission press the **<ENT>** key.

9.2.   Record number for retransmission

This function allows you to specify the number of events to be retransmitted directly from the timing function. To change this number press the **<F2>** key, insert the value required, from 1 to 999 and press **<ENT>**.

9.3.   Send chrono as net time

When this function is activated, instead of sending the information to the computer as the time of day, the stopwatch sends it as net time. This function feature is suitable for races in which there is only one group start (e.g. marathons).

9.4.   Send only times with assigned bib

When this function is activated, the stopwatch sends to the computer only the event with the competitor number assigned to it.

9.5.   Data output protocol

This allows you to choose which protocol to use for data transmission to PC. Each time a selection is made, one of the possibilities is activated, namely:
- **'Microgate'**: All the potentialities of the `stopwatch` are exploited
- **'Alge 4000'**: Data is transmitted using the same protocol as for Alge 4000. The choice of data that can be transmitted with this protocol is limited to net times only
- **'Radio Mod**.' Two REI2s can be connected through the Computer B port with a crossed cable. All the data are exchanged between the two stopwatches. The principle on which functioning is based is similar to Rei2Net with the difference that only two stopwatches can be connected, but

the connection can also be made via modem and so at greater distances. On serial A, however, the Microgate protocol is used for data output

- **'TimeLink'** used if you want to connect the TimeLink system to the port of computer B
 (see chap. 7 TimeLink on p.23)

For greater completeness and flexibility, we recommend that you use the Microgate protocol and that you use the Alge protocol only if there are problems of computing with the software used for data processing.

Transmission velocity is automatically set to 2400 for both serial ports (see chap.11.2 Hardware setup on pag. 32).

10.   Print record data

This function allows you to select the time events to be reprinted and to begin printing them. All the time events which meet the required conditions will be printed.

The enabled function keys are as follows:

- **<F1>** Each time this key is pressed, it enables (**Event time limits: active**) or disables (**Event time limits: disactive**) the time limits for the acquisition of the time events to be printed. In the case of **Limit active** only the time events acquired between the times of day specified as the limit will be printed
- **<F2>** With limits disactive allows you to specify the number of events to be printed
- **<F2>** With limits active allows you to specify the lower limit
- **<F3>** With limits active allows you to specify the upper limit
- **<F5> quit:** to return to the previous menu.

To start printing press the key **<ENT>**.

11. REI2 setup

The various configuration menus allow you to modify the numerous settings that affect the way REI2 functions. When you decide to delete the configuration at the start of a new race or select Modify basic configuration (see relative section 15 on p.32) and select the configuration most suitable for the timing session, all the parameters will be set to those values most suitable in the greatest number of cases.

11.1. *Software setup*

11.1.1. Time accuracy

When you select this option, you are asked for the precision of the measurement to be used for any subsequent truncation of stored time events.

The options available are:
- **<F1>** each time you press this key, one of the 5 alternatives (1", 1/10, 1/100, 1/1000 e 1/10000) is activated
- **<F2>** allows you to insert the figure (first not significant) starting from which you pass to the significant unit above (e.g. with precision at 1/100 setting 4 xx.2842 becomes xx.29 while xx.2839 becomes xx.28). If you set 0, truncation is always carried out
- **<F3>** activates the truncation of time events at the moment they are recorded. Each time you press the key, one of two alternatives is activated (**Yes** for truncation activated, **No** for no truncation). If truncation is activated, REI2 asks if truncation should be extended to all the time events of the race in progress and so also to those already recorded. With **<F5>** extension of truncation is not accepted, with **<F4>** <u>irreversible truncation</u> of all time events is accepted.

Time event truncation is useful in those races, such as the relay, in which, because of the various truncations, adding together the times of each relay runner can result in a total different from the total race time.

Truncation of chronological data is an irreversible operation. Once the intention to truncate the data present in the memory has been confirmed, it is no longer possible to retrieve the truncated part. Similarly, it is no longer possible to acquire the truncated part for all the new events recorded.

11.1.2. Confirm time

This function is active in the 'Competitor number assignment' configuration. Before confirming the data REI2 waits for the confirmation time. A value from 0 (the competitor number is assigned to the event only if previously inserted) to 255 seconds can be set.

11.1.3. Event existence check

If 'Event existence check' is set, two identical events cannot be assigned to the same competitor number. If this happens, REI2 indicates the error on the display and stores the event without any number assigned to it.

11.1.4. Print/Show climatic data

This function is for managing the Microgate climatic sensor, the light sensor and the wind gauge. The climatic sensor measures the temperature and humidity of the air and the snow temperature. The wind gauge takes the direction and speed of the wind in the area. The light sensor gives the intensity of light as a percentage. For information about the use of the sensors, the wind gauge and the relative consult the relative manual.

11.1.5. View current climatic data

This function continuously reads the climatic sensor and shows the data taken on the display. It also shows the data taken when the various competitors finish if activated with the function 11.1.7 Print climatic data: (on page 32)

```
  Hh:mm:ss.d
 Current Air temp. = -10,2 C
 Current Snow temp.= -13,5 C
 Current Air humid.=  35  %RU          .
 Store data         Air temp. =-11,5 C
 Number    7        Snow temp =-13.7 C
 Run    1           Air humid.= 37  %RU
   ↑     ↓       Print  Rep:--:--:   quit
```

Current climatic data

Climatic data measured at the moment the competitor finishes

Competitor number and run for which the data have been taken

Options available:
- **<F1> ↑**: to visualize the previous data acquisition
- **<F2> ↓**: to visualize the next data acquisition
- **<F3> Print**: to print the data on the display
- **<F4> Rep:** to insert the frequency, in hours, minutes and seconds, with which to read the sensor and the printout of the data

<F5> Quit to return to previous menu

11.1.6. View current wind data

This function continuously reads the wind gauge and shows the data taken on the display. If the function 11.1.7 Print climatic data: has been activated, it also shows the data taken when the various competitors finish.

```
  Hh:mm:ss.d
 Current air speed=  10,2m/s
 Current direction=  13,5°
 Current lux     =  35  %              .
 Stored data        Air speed= 11,5m/s
 Number    7        Direction= 13.7°
 Manche   1         Lux      = 37  %
   ↑     ↓       Print  Rep:--:--:   quit
```

Wind gauge data taken for current moment

Wind gauge data taken when competitor finished.

Number of competitor and run for which data was taken.

Options available:
- **<F1> ↑**: display previous set of data
- **<F2> ↓**: display next set of data
- **<F3> Print**: print data on display

- **<F4> Rep:** insert in hours, minutes and seconds the frequency with which the sensor is to be read and the data taken printed.
- **<F5> Quit:** return to previous menu

11.1.7.   Print climatic data:

Pressing the key **<F2>** switches between **Yes** and **No**, activating or disactivating measurement and printing on the printed strip of the climatic data taken at the moment each competitor finishes.

11.2.   Hardware setup

This menu contains the settings which guide the functioning of the stopwatch.

11.2.1.   LinkGate Channel

Pressing key **<F1>** opens a submenu which shows the setting the dip-switches must have on the LinkGate®Encoder for the channel previously stored. Pressing **<F2> Modify** activates the cursor next to the channel number, from 0 to 127. Key in the number you intend to use. When you have inserted the number and pressed **<ENT>,** the new setting the dip-switches must have on the LinkGate®Encoder is shown.

The first dip-switch does not affect channel selection and so is shown as **LONG** or **SHORT.**

Pressing **<F3>Length** modifies the position of the first dip-switch shown, alternately, as **LONG** or **SHORT**

The **<F5> menu** key returns you to the hardware configuration menu.

Remember that it is absolutely essential that the channel set on REI2 and on LinkGate Encoder should coincide. For further information see the User Manual.

11.2.2.   Printer

This allows you to turn the printer off. Each time the **<F2>** key is pressed, one of the two alternatives **Off** or **On** is activated.

11.2.3.   Beep Keys

This allows you to enable the emission of a beep each time a key is pressed. Each time the **<F3>** key is pressed, one of these two alternatives is activated: **Disabled,** no beep or **Enabled**, a short beep each time a key is pressed.

Beep emission always remains active.

11.2.4.   Display contrast

This allows you to vary the contrast on the display to improve its legibility in conditions of bad light. The **<F2>** key allows you to reduce contrast while the **<F4>** key allows you to increase it. By pressing the two keys **<F1>** and **<F4>** for more than 2 seconds, you can regulate contrast more rapidly.

Remember that you can activate back-lighting of the display with the **<Light>** key. Be careful not to quit this function when contrast on the display is regulated in such a way that it is impossible to read it.

The **<F5>** key returns you to the hardware configuration menu.

11.2.5. LinkGate transmission length

This function is similar to the one described in chap. 11.2.1 LinkGate Channel on p.32 for the modification of the duration of Linkgate transmission.

11.3. Serial ports setup

REI2 has two serials with protocol RS 232 for connection to data processors. The two serials, designated **Computer A** and **Computer B**, are individually configurable both for transmission velocity and the data presented. A few velocity combinations are, however, not available.

The configurable data is **Velocity** for transmission velocity, **On-Line data** for sending data as soon as an event has occurred, **Off-Line data** for sending data in response to a request by the processor and **Tick** for the sending of running time for every pre-set period.

When you enter configuration, the following function keys are activated:
- **<F1>** ↑ allows you to scroll up the various configurable features
- **<F2>** ↓ allows you to scroll down the list
- **<F3>** ⇔ to pass from serial A to serial B
- **<F4> modify** to change the setting indicated by ▶ ; each time you press, one of the values possible is activated
- **<F5> menu** to return to the configuration menu.

The values which can be set are:
- **Velocity** (in bps): 1200, 2400, 4800, 9600, 19200, 28800, 38400, 57600, 115200
- **On-Line data**: Yes for transmission activated , No for transmission not activated
- • **Off-Line data**: Yes for transmission activated , No for transmission not activated
- **Radio In**: Yes to enable the serial for wireless reception of events and to modify the speed to 1200.
- **Tick**: Disab. For no transmission, 1s, 1/10 and 1/100.

The values set can be changed with the appropriate commands sent by the processor REI2. For details of transmission and reception protocl, consult 22 REI2 – PC communication protocols on p.50.

☞ Not all the combinations of Serial A and Serial B velocity are compatible. REI2 indicates this by putting a line through the speed which cannot be set (e.g.: Ser. A: 1200 Ser. B 115200).

11.4. Print stopwatch configuration

With this function, which can be obtained by pressing the **<F4>** key **Print configuration**, you can get a complete printout of the configuration set on REI2.

12. Lines configuration

REI2 can receive impulses through various channels. As well as the line keys, the main lines (**START LAP AUX** and **STOP**), the LinkGate radio system (with or without built-in radio system) and the LinkPod system can be used. For operational and connection modes, consult the **User Manual**.

12.1. *Physical/Logical Channel assignment*

This menu allows you to specify how REI2 must interpret the signals coming from the various input devices.

12.1.1. Main lines and keys assignment

This function allows you to change the types of events acquired both on the main lines (**START**, **LAP**, **AUX** and **STOP**) and on the corresponding line keys.

The enabled function keys are:
- **<F1> c.logical** : each time you press, one of the possible options for the channel indicated by the symbol ◀ is enabled. The options possible are **STOP, N.ASS** for unassigned, **START, LAP** and **MANUAL** to only print the time event and not store it afterwards. If the LAP option is selected, REI2 asks which intermediate stage/lap, from 0 to 249, it must be assigned to. If set at 0, REI2 will automatically move the lap number forward with each impulse
- **<F2> ↑↓** allows you to scroll the list of physical channels
- **<F3> ⇔** allows you to pass quickly from the line management column to the key management column
- **<F5> menu** to return to the configuration menu.

☞ Although it is possible to change assignment of the physical channel of the keys, you are advised to do this only in cases of absolute necessity, taking great care after the modification has been made not to be misled by the characters on the keys.

12.1.2. Radio Channel Assignment

This function allows you to change the event types acquired through the LinkGate radio system. The radio channels are presented on two distinct screen displays, the first from 0 (start) to 7 and the second from 8 to 15. (**STOP**).

Initial assignment of radio channels is as follows:
- radio channel **0** as logical start channel
- radio channels from **1** to **9** as logical lap channel from 1 to 9 and then, radio channels from **A** to **D** as logical channels from 10 to 13
- radio channel **E** as generic lap (lap 0)
- radio channel **F** as logical stop channel.

The enabled function keys are:
- **<F1> c.logical** : each time you press, one of the possible options for the channel indicated by the symbol ◀ is enabled. The options possible are **STOP, N.ASS** for unassigned, **START, LAP** and **MANUAL** to only print the time event and not store it afterwards. If the LAP option

is selected, REI2 asks which intermediate stage/lap, from 0 to 240, it must be assigned to. If set at 0, REI2 will automatically move the lap number forward with each impulse
- **<F2>** ↑↓ allows you to scroll the list of radio channels
- **<F3>** ⇔ allows you to pass quickly from one column to another
- **<F4> Others** allows you to pass from the management of the channels from 0 (radio start) to 7 to the management of the channels from 8 to 15 (radio **STOP**)
- **<F5> menu** to return to the configuration menu.

12.1.3.   Linkpod Channel Assignment

As better described in the **User Manual**, the Microgate LinkPod © system consists of a series of from 1 to 10 'concentraters' (pods) connected via cable. Depending on the type, each concentrater has up to 8 inputs making up a total of 80 lines.

This function allows you to assign the physical channel corresponding to each of the single pod inputs to a logical channel. Each pod is presented on its own screen display.

The enabled function keys are:
- **<F1> c.logical** : each time you press, one of the possible options for the channel indicated by the symbol ◄ is enabled. The options possible are **STOP, N.ASS** for unassigned, **START, LAP** and **MANUAL** to only print the time event and not store it afterwards. If the LAP option is selected, REI2 asks which intermediate stage/lap, from 0 to 249, it must be assigned to. If set at 0, REI2 will automatically move the lap number forward with each impulse
- **<F2>** ↑↓ allows you to scroll the list of inputs of each LinkPod
- **<F3>** ⇔ allows you to pass quickly from one column to another
- **<F4> N.Pod** allows you to pass from the management of one LinkPod to another by inserting their respective numbers from 0, for the first, to 9
- **<F5> menu** to return to the configuration menu.

The number of LinkPods configured does not depend on the position of the cable but on the value set on each LinkPod.

12.2.   Holdoff time lines

This allows you to modify the disactivation times of inputs after the acquisition of an event. Each line can be configured individually.

The enabled function keys are:
- **<F1>** ↑↓: allows you to scroll the list of the various configurable lines. The line selected is indicated by the character ◄ and the disactivation time expressed in milliseconds can be inserted immediately
- **<F2>** ⇔ allows you to pass quickly from one column to another
- **<F5> menu** to return to the configuration menu.

The last lap value (the one at the bottom on the right) can be configured for the channel number as well as for holdoff time.

The disactivation value can adopt any value you like between 0 and 60,000 milliseconds (1 minute).

If you try to change the value for a channel for which there is no corresponding physical channel, for a few seconds the message **'Logical.chan not assigned to physical chan.!!!'** appears.

12.3. Line exclusion configuration

The **<LCK>** key situated over the **<STA>** key can be configured so as to offer the user the possibility of operating on one or more logical channels of his/her choice. (Vice versa, the **<LCK>** key over the **<STO>** key acts exclusively on the Stop logical channel). From this menu it is possible to select the lines on which the key is active. It is advisable to set those lines which are in fact controllable by the user.

The activation or disactivation of the **<LCK>** function on a line is shown by a filled-in rectangle for lock enabled or an empty rectangle for lock disabled. A black blinking rectangle shows the position of the cursor.

The enabled function keys are:
- **<F1>** ←: allows you to move the cursor to the left on the various lines
- **<F2>** →: allows you to move the cursor to the right on the various lines
- **<F3> modify**: pressing this enables or disables sensibility to the **<LCK>** key for the line on which the cursor is positioned
- **<F4> N.lap** allows you to set the lap number of the last rectangle on the right
- **<F5> menu** to return to the configuration menu.

The **<Rearm>** key situated next to the **<LCK>** key operates on the same lines set for the **<LCK>** key.

12.4. N/O N/C lines configuration

REI2 is designed to accept commands from devices which have contacts which are normally (at rest) either open or closed. From this menu it is possible to select the type of contact present on each of the main lines, both those connected through banana jack sockets or through standard din sockets.

The enabled function keys are:
- **<F1> Start**
- **<F2> Lap**
- **<F3> Stop**
- **<F4> Aux**
- **<F5> menu** to return to the configuration menu.

Each time the key associated with a line (from **<F1>** to **<F4>**) is pressed, one of the two options **Normally open** or **Normally closed** is enabled.

The Linkpod © inputs can be configured by acting directly on the device. For further information refer to the **User Manual**.

12.5. Noise filter principal lines

REI2 filters spurious events coming from external lines (e.g. start gates or switches).

The enabled function keys are:
- **<F1> Start**
- **<F2> Lap**
- **<F3> Stop**
- **<F4> Aux**

- **<F5> quit** to return to the configuration menu.

By default the noise filter is active on the Start line.

Every time the key assigned to a line is pressed (from <F1> to <F4>) one of the two options **Yes** – **No** is enabled.

13. LinkGate data upload

Microgate LinkGate Encoder's device for radio transmission of impulses allows you to transmit all the event times and speeds obtained during timing (up to a maximum of 256 times and 256 speeds) to REI2. This possibility enhances reliability as it enables you to 'retrieve' after an interval of time any times which for one reason or another have not been transmitted via radio.

With this function the data present in the encoder can be transferred to REI2.

After disconnecting the decoder and connecting the encoder with the dedicated cable (see **User Manual**), press **<F1>** to activate reception on REI2 and activate transmission on the encoder by pressing <**2nd**> and, keeping it pressed down, pressing the **<SERIAL>** key.

Within two seconds two counters will appear on the screen to indicate the number of times and speeds transmitted.

When you have finished transmission, on pressing <**ENT**> another menu will appear.

If you choose **<F1> Absolute**, the event times are simply transferred and shown in the same way as when they were acquired. It is therefore essential that the LinkGate Encoder device and REI2 have been synchronized (consult the **User Manual**) before beginning the timing session (if you do not want to have to make a laborious series of calculations and corrections later).

If you choose <**F2**> **Automatic Synchronization** the two devices are synchronized after an interval of time, when the data is transferred.

In this way times are given their correct values even if the LinkGate Encoder and REI2 have never been synchronized. This second option is usually the most convenient one. However, it is indispensable that no change be made to REI2's synchronization in the time between the end of the timing session and the moment when data transfer is made. Similarly, it is better to transfer data immediately after the end of the timing session so as to reduce the deviation caused by the inevitable slight divergence between the time bases of the two devices (see the technical specifications of LinkGate Encoder and REI2 for an estimate of possible divergences).

You can print the times and speeds transferred from LinkGate Encoder, pressing <**F1**> to facilitate the assignment of times.

After choosing the time reference, you automatically enter the assignment function. With this operation, you can assign an event time transferred from LinkGate Encoder to an athlete's number for a certain run. The transferred times are shown in the fourth line of the display. The event times immediately before and immediately after the acquired time are shown in the third and fifth line respectively. In this way, it is easier to 'orientate' yourself amongst the times until you find the time or times you wish to retrieve. To pass from one time to the next without assigning them, press <**ENT**>. To scroll backwards and forwards through the acquired times, press <**F1**> or <**F2**>. To assign a time to a competitor number, insert the number directly, confirm with <**ENT**> and then insert the run number. If you try to assign a time already used, the stopwatch will show a warning signal.

The enabled function keys are:

- **<F1> ↑**: allows you to scroll up the events to be assigned
- **<F2> ↓**: allows you to scroll down the events to be assigned
- **<F3> Homolo / All /Sta / Sto** Each time the key is pressed, one of the two time display modes is activated. **Homolo** displays only events of the same type (e.g. only Lap 1s, only starts, etc.). With **All**, the previous and following times are shown regardless of type; with **Sta/Sto** only the start and finish events are displayed
- **<F5> menu** to quit the function.

Example of Lap 1 acquisition:

```
 Hh:mm:ss.d Reception from LinkGate:
Event      N. Man   Time
Lap   1    10    1  10:55:14.12_14
Lap   1                10:57:12.54_85
Lap   1    12    1  10:58:16.36_98
Number: _____  Run: ___

   ↑          ↓     Homolo    D    Menu
```

In the example, after the Lap 1 signal for number 10, an unassigned signal appears, and then a signal for number 12.

So the time probably refers to the intermediate time of competitor 11.

Note: it is convenient to have an approximate idea of the time of the missing time event/events, possibly with the help of a printout of previous times.

14. Linkgate radio signal level

An essential condition for the correct use of the LinkGate system is a sufficiently high level of the quality of its radio signal. With this function, REI2 allows you to test its efficiency.

When you enter this function, the words **'RADIO SIGNAL QUALITY TEST'** appear, followed on the next line of the display by the words **'Ready to receive…………'**. At this point you can start a test transmission (for example, a start signal). After about 3 seconds from the start of transmission, during which the words **'Reception in progress…………'** is shown, the channel of the signal received and the quality of the signal expressed as a percentage are displayed. Naturally the higher the percentage, the higher the quality of reception.

Values above 40% are considered 'safe'.

If the channel set on the LinkGate Encoder does not coincide with the channel set on REI2 (see section 11.2.1 LinkGate Channel on p.32), , the message **'RADIO XXXX – Channel xxx Signal= xxx% - Different channel received'** appears

 appears.

If the level of quality of the signal received is below 40%, one or more of the following steps can be taken:
- place both the transmitting and receiving radios (the radios connected to the Encoder) in an elevated upright position
- change the working frequency to avoid interference from the frequency used by other transmitters
- especially for the transmitting radio, use more efficient antennas such as ¼ or 5/8 wave antennas instead of the normal 'charged' type

The antennas supplied with the integrated LinkGate EncRadio and LinkGate DecRadio transmission system already have a high level of efficiency.

Note: the quality signal test should preferably be performed with the 'short-long' selector of the LinkGate Encoder device in the 'Long' (L) position. If the selector is on 'Short' (S), the maximum 'quality' value indicated by the test is about 25%.

For further details about the LinkGate system, consult the **User Manual**.

With the **<F5> menu** function key, you return to the previous menu.

15. Set modem

In this menu it is possible to communicate with a modem connected to REI2.

```
  Hh:mm:ss.d                              ──── Number to be called

Number:
Serial: COMPUTER A (  9600bps)   ◄──── Serial enabled for connection to modem
 ◊ = Change serial
In call…                          ──── Indicates modem status
Number  Insert  Close    Answer    Quit
```
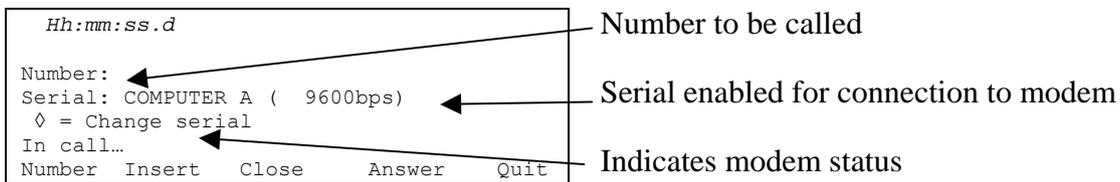
The active function keys are:
- **<F1> Number** allows you to insert the number to be called
- **<F2> Insert** to call the number inserted
- **<F3> Close** to interrupt communication with the modem
- **<F4> Answer** to reply to the external call
- **<F5> Quit** to return to the configuration menu.

To call an external number just connect the modem to the enabled serial output, insert the number to be called by pressing **<F1>** and keying in the single numbers in succession. Then when **<F2> Insert** is pressed, the text **In call…**. will appear. If the number called replies, the connection is automatically activated.

When there is an external call, the text **In answer…**. will appear. Press **<F4>** to activate connection to the modem.

16. Battery recharge

During normal functioning, the presence of a valid external source of power supply (with a socket as symbol) or low battery condition (with the symbol of a battery) is shown in the display to the right of the first line. From the moment the symbol appears, about 90 minutes of autonomy remain.

Recharging of REI2's internal batteries is managed entirely by the microprocessor. In this way it has been possible to implement a recharge control which guarantees maximum efficiency of the batteries at all times, at the same time prolonging their operational life.

When you enter this function, the current state of power supply is shown on the sixth line of the display as follows:

- **'Batteries in use …'** the internal batteries are being used
- **'Maintenance'** the stopwatch is supplied by the external power source and at the same time the efficiency of the batteries is maintained by a trickle charge but they are NOT recharged
- **'Discharge…'** the internal batteries are being completely discharged before being subsequently recharged
- **'Recharge'** recharge in progress; on the right, the time remaining before the end of recharge is shown
- **'Recharge blocked'** recharge has been temporarily interrupted because of insufficient voltage. It will resume automatically as soon as a sufficient level of voltage is restored.

To recharge the batteries, connect a continuous 12-20 volt power source to the appropriate power point.

☞ To recharge the batteries or completely discharge them, REI2 must remain switched on. During recharge it is possible to carry out every kind of timing. The important thing is not to switch it off.

16.1. Discharge/Recharge

When this function is selected, the internal batteries are first completely discharged and then recharged. This is the most correct procedure for keeping the internal batteries at maximum efficiency.

The duration of the discharge phase depends on how fully the batteries are charged and can last up to about 3 hours.

The duration of the subsequent recharge phase is 7 hours, at the end of which the message **'RECHARGE OK!'** appears.

16.2. Immediate recharge

If it is not possible to charge or recharge in the correct way because of lack of time or for any other reason, it is possible just to recharge. In this way recharge time is reduced but this procedure is not recommended as it reduces the efficiency of the batteries.

16.3. Break

With this function the discharge and recharge phases are interrupted. REI2 returns to maintenance status.

MICRO GATE

17. Line status

This function allows convenient management of the status lines connected to REI2. To the right of their description, the main lines, **START**, **LAP**, **STOP** and **AUX** have a little circle which indicates their status. For the Pods of the LinkPod system, the status of each of the 8 inputs of each Pod is indicated.

The indicators mean:
- Empty circle   Line at rest
- Filled-in circle   Line active
- Line (only Pod)   Pod not present or not correctly connected or line not physically present on the Pod (Pod with fewer than 8 inputs).

18.   Time Calculator

REI2 has a sexagesimal calculator.

18.1.   Normal

Key in the first time you wish to add or subtract (TA); then key in the second time (TB).

The enabled function keys are:
* **<F1> A+B**: adds TA to TB
* **<F2> A-B**: subtracts TB from TA
* **<F3> modify** allows you to change the two set times
* **<F5> menu** to return to the previous menu.

The times are 'normalised' to 24 hours; for example, 2:00:00.000+23:00:00.000 = 1:00:00.000 and not 25:00:00.000.

Be careful when keying in thousandths, especially if the times to add or subtract are expressed with an accuracy of a tenth or a hundredth; for example, to insert the time 1:02.84 (one minute, two seconds, 84 hundredths), you must key in:
<0> <ENT> (hours)
<1> <ENT> (minutes)
<2> <ENT> (seconds)
<8><4><0><ENT> (ten thousandths), and NOT **<8><4> <ENT>.**

18.2.   Extended (day management)

Functioning is the same as for the normal calculator. In addition it offers you the possibility of inserting a figure for the day, thus allowing calculations on values which cover a number of days.

19. Race management

REI2 can memorise up to 8 different races and their relative configurations. It is possible to suspend a race at any moment, to manage a different one and then to retrieve the suspended race.

As soon as REI2 has finished checking synchronization and memory content it activates the race management menu.

At the end of timing, no operation is necessary to memorise a race. All the data is automatically recorded in the stopwatch's memory and retained also when the machine is switched off. For stored data retention times, consult the User Manual.

19.1. New race

Selecting this option allows you to start a new race. You are asked for the program to be used and when you have selected this, you are given the indication '**NEW RACE'** and the number assigned on the printout.

If all the eight races available have been stored, the message '**ATTENTION! – Race Memory Full – Delete one or more races – Press a key to continue'** appears and you must delete one of the stored races to be able to continue.

19.2. Delete/Recall stored race

This option allows you to retrieve or delete a previously stored race from the list of races proposed.

In the column
- **RACE** the progressive race number appears. The symbol * to the left of the number indicates the last active race, which is retrieved if Continue current race is selected.
- **DATE** the start date
- **START** the start time
- **TYPE** the type of program used for the race.

The positions which are free for memorisation of a race are indicated by '**---**'

The enabled function keys are
- **<F1> ↑**: to scroll the race list up
- **<F2> ↓**: to scroll the list down
- **<F3>** deletes the race shown by the symbol ◀ . You are requested to confirm that you wish to delete the race, **<F4>** to delete, **<F5>** to annul deletion. If you select an unused race number, the message '**Impossible to delete'** appears
- **<F4>** retrieves the race indicated by the symbol ◀ and allows you to resume timing it. If you select an unused race number, the message '**Race not available'** appears.
- **<F5>** to return to the previous menu.

19.3. Continue current race

By selecting this option, you resume timing of the last race stored, and retain all its timings and configuration settings.

19.4. Clear all memory

Selecting this option allows you to delete all the data of all the stored races. On the display the message '******* **ATTENTION ******* - All data and races will be irreversibly cancelled, proceed?'** Press **<F4>** for **Yes** to delete all the stored races, press **<F5>** for **No** to annul the deletion operation.

20.   Modify basic configuration

This function allows you to select which configuration, of the 2 proposed, is most suitable for the requirements of the event you intend to time. When you have selected the basic configuration, you can make whatever change you like to the configuration proposed.

The enabled function keys are:
- **<F1> PC-ONLINE standard**
- **<F2> PC-ONLINE with ass.competitor numbers**
- **<F3> Vintage car race**

For the values set by REI2, see Pre-set configurations on p.49.

21. Pre-set configurations

The table below summarises the standard settings activated when one of them is selected:

	Standard	Competitor number assignment	Vintage car race
Measurement precision	1/10000	1/10000	1/10000
Holdoff times (Start, Lap, Aux, Stop)	500,200,200, 200	500,200,200, 200	100,100,100, 100

22.   REI2 – PC communication protocols

22.1.   For PC

By using appropriate protocols, it is possible to ask REI2 for a series of items of information stored in its memory, such as net times and time events, running times and the status of competitors. The details and specifications of communication are given in **Communication protocols.** No command sent through the connectors Computers A and B can change the data present in the stopwatch apart from those specified, which, however, have to be confirmed on REI2.

For connection between REI2 and computer, use the ports 'Computer A' and 'Computer B'.

23.   Some considerations

REI2 numbers the strings sent on the serial from 1 to 999999 consecutively, restarting from 1 when the value 999999 has been exceeded, so:

• if a string appears with a repeated identifying number without a specific retransmission request, this means that something has been changed in the previously transmitted event with the same identifying number, such as the time, the competitor number or the event type (channel)

• any 'gaps' in numbering indicate that one or more strings transmitted by REI2 may not have been received by the processor. In this case it is possible to ask REI2 to transmit the last n events, or to do this from REI2 using the function 5.4.4 Transmission repetition (see p.14) or the function 9.1 Off-Line data transmission (see p.27) after checking the connection cables.

The strings sent by personal intervention from REI2 are all of the same length and finish with CARRIAGE RETURN (hex: 0D) and LINE FEED (hex: 0A). If strings of different length are received, check the serial connection and if necessary, lower the velocity of the serials.

All the significant elements of the strings are in printable character.

When requests are made by the processor, remember that:

• Transmission times of REI2's replies can be quite long when 'bulky' data is requested (e.g. all time events).

• Requests are dealt with in strict sequence, with reply strings being placed in line behind those of any previous requests.

• When an event is acquired, the strings generated by REI2 by personal intervention are immediately transmitted on the serial and the transmission of the other strings waiting to be transmitted is temporarily suspended.

24.   Menu structure

20.1.   Initial menu

A: New race
        A: Single starts
        B: Group starts
        C: Simple stopwatch
        D: Parallel Slalom
Other
        A: Show jumping
        B: Swimming
        C: PC-ONLINE
        D:Dual Time
B: Delete/Recall stored race
C: Continue current race
D: Clear all memory
Other
A: Battery recharge
        A: Discharge/Recharge
        B: Immediate recharge
        C: Break
B: LinkGate radio signal level test
C: Line status (main lines and pod)
D: Autotuning Battery

24.1.   Race menu

(M 1)

 M 1.A: Timing   5 Timing 10
 M 1.B: Synchronization   8 Synchronization 25
   M 1/2.A: Synchronization   8.1 Synchronization 25
   M 1/2.B: Modify synchronization value   8.2 Modify synchronization value 25
   M 1/2.C: Synchronization verify   8.3 Synchronization verify 25
   M 1/2.D: Signal   8.4 Signal 26

 M 1.C: Download data to PC   9 Download data to PC 27
   M 1/3 A: Off Line data transmission   9.1 Off-Line data transmission 27
   M 1/3 B: Record number for retransmission : …   9.2 Record number for retransmission 27
   M 1/3 C: Send chrono as net time   9.3 Send chrono as net time 27
   M 1/4 D: Data output protocol   9.5 Data output protocol 27
      Other
   M 1/3b A: Send only times with assigned bib   9.4 Send only times with assigned bib 27

M 1 D: Print record data   10 Print record data 29

Other (M 2)

 M 2.A:REI2 setup   11 REI2 setup 30

25. Editing history

The following table summarises the main changes made to this document.

Program version	Chapter	Page	Editing description
1.03			Only internal changes made.
1.07.9			General edit for version 1.07.9

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The software and manuals are available in the following languages: Italian, English, German and French.

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