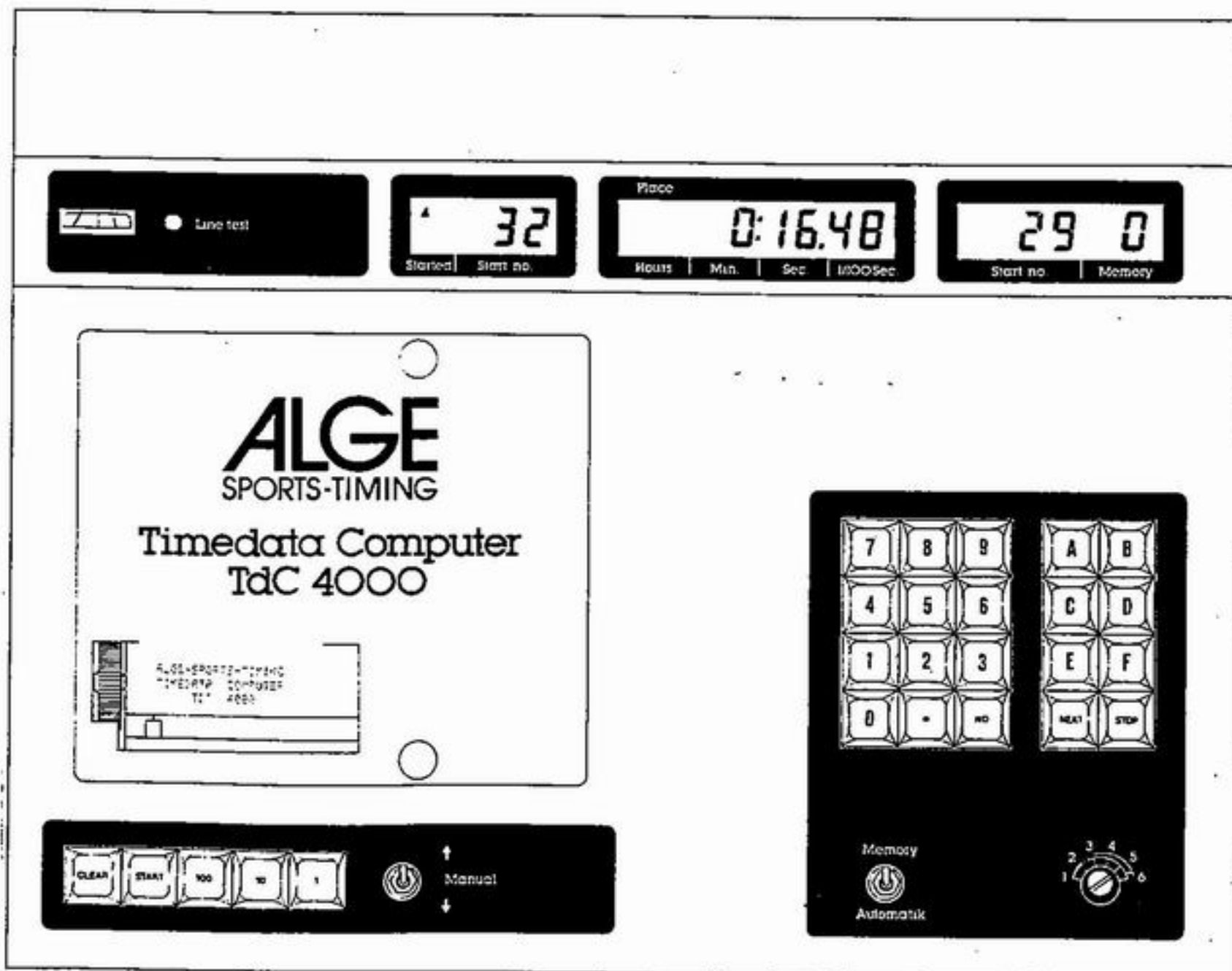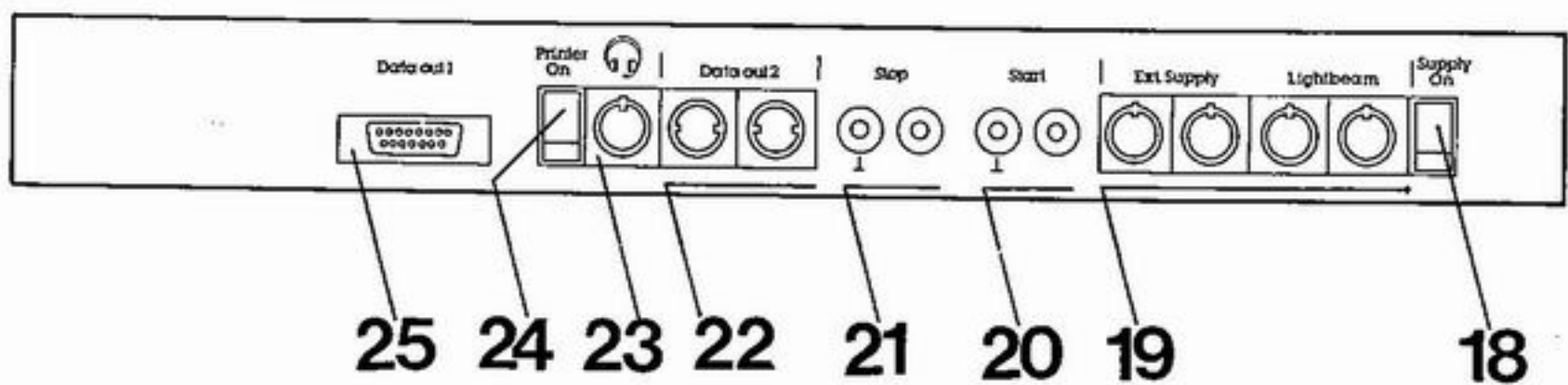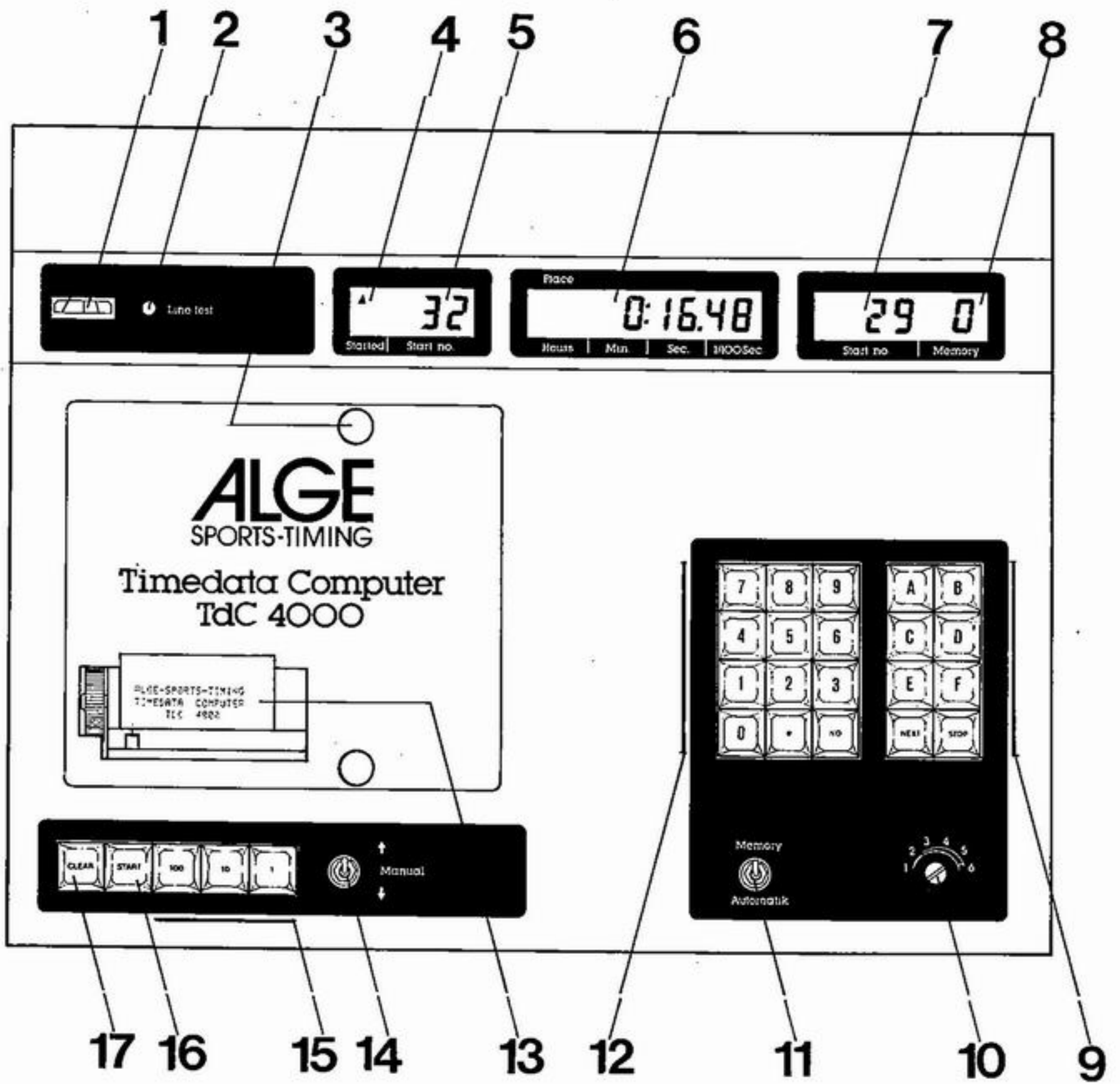# ALGE-SPORTS-TIMING

Timedata Computer
TdC 4000

In October 1979, ALGE SPORTS TIMING introduced with success the first data-processing timing installation in the world, the Timedata Computer TdC 2000.

With it's 64-Kbit data memory and an equally large program memory, the **Timedata Computer TdC 4000** represents the further developed second generation. In combination with today's most modern microprocessor, the TdC 4000 provides the highest measuring accuracy to 1/1000th of a second as well as multiple timing functions for the most varied types of sports and data processing (indication of standings, calculation of racing points, computing overall times, ranking).

The program memory can be doubled from 64 Kbit to 128 Kbit at any time exchanging a plug-in EPROM. With the TdC 4000 you possess not only the most advanced timing computer but also one that has a secure future with it's complete capacity for new programs that may become necessary.

As with all our timing devices, we have laid the upmost emphasis on the simplest possible operation. You will see that we have succeeded here too, when you get acquainted with the TdC 4000 with help of these operation instructions.

Line test

32
Started | Start no.

Place
0:16.48
Hours | Min. | Sec. | 1/100 Sec.

29 0
Start no. | Memory

ALGE
SPORTS-TIMING

Timedata Computer
TdC 4000

ALGE-SPORTS-TIMING
TIMEDATA COMPUTER
TdC 4000

7 8 9   A B
4 5 6   C D
1 2 3   E F
0 . NO   NEXT STOP

Memory
Automatik

2 3 4 5
1   6

CLEAR START 100 10 1   ↑ Manual ↓

1 2 3 4 5 6 7 8

17 16 15 14 13 12 11 10 9

Data out 1   Printer On   Data out 2   Stop   Start   Ext Supply   Lightbeam   Supply On

25 24 23 22 21 20 19 18

<u>ALGE-SPORTS-TIMING</u>

TdC 4000 OPERATING INSTRUCTIONS

ALPINE SKIING

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<u>ALGE SPORTS TIMING</u>

<u>TdC 4000 OPERATING INSTRUCTIONS</u>

<u>ALPINE SKIING</u>

Basic Principles of Operation

The **TdC 4000** is simply a very efficient machine for managing timing data. It is designed to keep track of bib numbers and their associated times and race points over various runs. The most important adjustment that you will have to make is to pay very close attention to bib numbers at the start and finish. Bib numbers, and the times associated with them at the start and finish are the key to operation.

In alpine skiing, we will operate the **4000** in "**difference-timing mode**"; so called because the machine compares start times and finish times for bib numbers, and calculates the run times based on the **difference** between these two times. As each competitor starts, a time is generated by the internal clock. We associate this start time to a bib number. At the finish, we do the same thing, associating bib numbers to finish times pulled from the internal clock. As soon as the **4000** has a start time and a finish time for any bib number, it calculates the run time by subtracting the start time from the finish time.

The internal clock is always running, and we cannot stop this clock except by turning the machine off. Even if we make mistakes in associating bib numbers to start and finish times, we cannot lose a time. If operator errors are made, the **4000** simply prints out the internal clock times of either start or finish, to be used as required.

The machine is divided into three sections. The **Green Sections** refer to **Start** functions; the **Red/Orange** sections refer to **Finish** functions, and the **Gray display** shows you the **time of the bib number keyed in at the finish**. We will proceed step by step through a normal event with two runs, and work through errors and how to correct them.

Start Up and Initial Programming

Sounds difficult, but we are simply telling the **4000** what type of race we are running. Turn on the **4000** and it will print:

                    ALGE-SPORTS TIMING
                    TIMEDATA COMPUTER
                       TDC 4000

                    01 RUN(S) STORED

                    CLEAR STORE?

If there is a run or runs stored, reply with (.) meaning "yes" to clear the stored memory. **CAUTION: CLEAR THE STORED MEMORY ONLY IF YOU ARE STARTING A NEW RACE, FIRST RUN. This clears the memory and wipes out the first run times.**

The **4000** will now print:

> STORE CLEARED
>
> PRECISION   1s (1)
>   1/10s (2)
>   1/100s (3)
>   1/1000s (4)

The 4000 is asking you which precision to use. **Select (3): 100ths.**

> PRECISION 1/100s
>
> SPLIT   (1)
> SEQUENTIAL   (2)
> RALLY   (3)
> SPLIT SEQUENTAL   (4)
> EXTENDED SPLIT   (5)
> EXT. SPLIT-SEQ.   (6)
> SPECIAL PROGRAMS   (7)

It confirms 100ths. selected and presents the mode options menu. For Alpine Skiing, two runs, **select (1): Split.**

> SPLIT
>
> max. 250 STARTERS
>
> START IN GROUPS?

Split mode is confirmed, allowing a maximum of 250 skiers. The 4000 now asks if the racers will start in groups, such as in cross country events. **Reply (No)**

> NO
>
> DIFFERENCE TIMING (1)
> ABSOLUTE TIMING   (2)
>   SECONDS ONLY (3)

Now **select (1) Difference Timing.**

> DIFFERENCE TIMING
> INPUT 'TIME OF DAY'

Because difference timing means that we will poll the internal clock for start and finish times, this clock must start from a certain point. The request to INPUT 'TIME OF DAY' means; what time will we synchronize the internal clock at? I suggest for simplicity, start from zero. **Respond simply with (.) meaning yes.**

2

```
                         TIME OF DAY
                         00:00:00.00.0

                         START CLOCK AT
                         SYNCHRON TIME!
```

The **4000** confirms that we will synchronize from zero and asks you to
start the internal clock when you are ready. At this point you may
wish to synchronize with hand timing. When ready, start the internal
clock by **pushing the Green START Button,** or by having your starter
open the start gate.

```
                         READY FOR TIMING

                    *********************
```

The **4000** is now ready for the first run, and with the **memory/automatic
switch** that you will find in the red area set to **automatic,** the
internal clock time is displayed and should be running.

Forerunners

Forerunners are always a good idea so that the start wand and
photocell operation can be verified. Select a number in the **start grid
(Green Window)** using the gray keys and the toggle switch. We usually
use 241, 242, 243 etc., for forerunners, and then take them out of the
results at the end of the race. Once a bib number is selected in the
start grid, **return the toggle switch to "Manual".** (Center Position).

With 241 in the start grid (Green Window) now put 241 in the finish
grid (Red Window) using the numeric key pad. Always confirm your
selection using the (.) "yes" key. Keep the memory/automatic toggle
switch set to automatic. When the first forerunner starts, assigned
bib 241, the time on the gray display will start running from zero. In
the start grid, an "L" will appear next to 241, signifying that 241
has started.

Advance the number in the **start grid** to 242, and**return the toggle to
the manual position.**Confirm with your starter that forerunner 2 is in
the gate, and start forerunner 2 (bib 242).

By this time 241 should be near the finish. **With the toggle in the red
area set to automatic, and the number in the red finish grid selected
to 241 (and verified with the (.) "yes" key), the finish impulse from
the photocell will generate a finish time and AUTOMATICALLY associate
the time to the bib number in the finish grid (This is why the toggle
is set to Automatic).** As 241 finishes the **4000** prints as follows:

```
                    241 ST 00:04.54.59.5
                        FT 00:05:39.57.5
                        RT 00:00:44.98
```

ST = Start Time (Based on Internal Clock)
FT = Finish Time (Based on Internal Clock)
RT = Run Time (Based on the Difference between ST and FT)

NOTE: When you selected 1/100s as the 4000 was programmed at start-up, it still uses the data collected down to the 1/1000s, except that it truncates the calculated Run Time (RT) to the 1/100s position. This is the accepted method of the FIS.

Keep going with 243 in the start. The **4000** can accept as many racers on course as you can handle. You must however develop a system to keep track of **who is next to start, and who is next to finish.**

Get all the forerunners down the hill and finished before you start the first competitor. Adjust your start interval (GS, Super-G and DH) to suit safety conditions. Note that the 4000 can handle simultaneous Start and Finish conditions. You must simply have the correct bib numbers keyed-in in advance.

Basic Timing

Select bib 1 in the start grid, and leave or return the toggle switch to manual. If you leave the switch in up, or down, false triggering of the start wand can get you into trouble quickly, assigning false start times to many bibs. Left in the manual position, if more than one start time is received, they are simply printed out with question marks. You may start bibs in any order you like, as long as you **keep track of who is next to start and finish.**

Start bib 1, and **key in (1) plus (.) in the finish grid.** Check that the **memory/automatic switch** is set to **Automatic.** The gray display window now shows you bib 1 running time.

Confirm with the starter that Bib 2 is in the start and **select 2 in the start grid.** Start Bib 2 when the correct interval has elapsed, and **select bib 3 in the start.** Return the toggle switch to manual.

You must wait for bib 1 to finish before moving on to bib 2 in the finish grid. When bib 1 finishes, the time is displayed and printed out. Select **bib 2 in the finish grid,** and don't forget to **confirm your choice with the (.) "yes" key.**

Confirm with your starter that bib 3 is in the start, and **start bib 3** at the correct interval. Immediately **select bib 4 in the start grid** and confirm with your starter.

As bib 2 finishes the time is printed out. Go on to bib 3 by **selecting 3 in the finish grid, confirmed with the (.) "yes" key.**

This goes on for the entire run. If a racer does not finish, simply key in the next logical bib number to finish. If you are not sure who the next racer to finish is, place the toggle switch in the red area to Memory, and read on.

Bib 2 and 3 are on course, but bib 2 is overdue. A racer is approaching the finish line, but you are not sure who it is. Normally the **Memory/Automatic switch** is placed in the **Automatic** position so that finish times are **"Automatically"** associated to bib numbers as the finish beam is broken. This is fine as long as the racer finishing is who we expect it to be. In most cases, even though we cannot see the bib, we should assume that **as long as the time seems to be in the correct range, it's the right bib crossing the line.**

When neither the time seems correct, or you are simply not sure who is finishing, **flip the toggle switch to MEMORY and wait.**

As the competitor crosses the finish, the **4000** will beep, and the finish time is sent to a memory that has an 18 **finish time** capacity. When you can see that the bib is indeed, in this case bib 3, leave the switch set to memory, and **select (3), (.) confirm,(E), (next).**

The **4000** assigns the finish time that is in the **finish memory** to the bib number 3. After a very short delay, the run time is printed out as usual.

What you are doing is saying to the **4000** after the fact, that the finish time in the **finish memory** should be associated with bib 3. This is accomplished by **keying in the correct bib number, pressing the "E" key, and then clearing out the memory by pressing the "next" key.**

You could in fact operate the entire race in this manner. The problem is that many more key strokes are used, and if you are using an outside display, the running time is not shown to spectators.

We suggest that you use the finish memory only as a last resort. It gives you time to think, and to associate finish times to bibs when you are sure what time belongs to which racer.

Even if you make a mistake associating start times or finish times to bibs, the times are never lost. Note that the start and finish times are always printed out or stored in a memory location. **As long as you have those start and finish times, you can deduce or calculate the run times.**

Clearing Out a Run Time: (C) + (3)

Ok, so you didn't have time to flip up to memory, and now bib 2 who will not finish, has bib 3's finish time, and bib 3 who just finished does not have a time at all.

The problem is simple now, but under stress; a bit confusing. The **4000** however will allow you to sort out the correct time for bib 3 by assigning the finish time (presently residing with bib 2) and associating it with it's rightful owner bib 3

First of all, delete bib 2's false Run Time. **With bib 2 in the finish grid, simply press (C).** The **4000** prints:

```
INPUT FINISHTIME      (1)
INPUT RUNTIME         (2)
DELETE RUNTIME        (3)
INPUT STORE           (4)
DISQUALIFICATION      (6)
EXIT                  (NO)
```

Select **option (3), Delete RunTime.**

Bib 2's running time based on the start time will appear in the gray display area.

IMPORTANT NOTE: You must have the bib number that you wish to correct in the finish grid (Red Window) BEFORE you begin any corrections using the (C) key.

In this case, as bib 3 crossed the line, we had bib 2 keyed into the finish grid, and the correct finish time was associated with the wrong bib number. **By pressing (C) and then (3), we clear out the erroneous run time for bib 2,** thereby removing him from the results file.

Entering a Finish Time

We now want to associate the correct finish time for bib 3 which we will find in the erroneous print out for bib 2 next to FT. **Put bib 3 in the finish grid (always remember to confirm your bib entered with the (.) "yes" key), and again press (C)**

```
INPUT FINISHTIME      (1)
INPUT RUNTIME         (2)
DELETE RUNTIME        (3)
INPUT STORE           (4)
DISQUALIFICATION      (6)
EXIT                  (NO)
```

This is the same menu as before, but we now want option
(1): INPUT FINISHTIME.

The gray time display is now showing all zeros. Using the **correct Finish Time** that you have from the printer tape, key in the Finish Time for bib 3. Notice that the Finish Time is expressed down to 1/1000th of a second. This 1000th should be keyed in, and you will notice a space for it on the left edge of the red finish grid.

When the finish time for bib 3 is keyed in, the **4000** prints the corrected runtime. **If you made a mistake, use (C) (3) again to delete the run time, and then (C) (1) to input the finishtime.**

Correcting Start Times

Mistakes concerning Start Times are a result of not listening to your
starter, or false start signals by racers hitting the wand with their
poles.

Corrections are effected by first clearing out erroneous Start Signals
associated to bibs using the **"clear"** key (found on the extreme left of
the green area); or by associating Start Times to bibs by inputting
the Start Times using the **(D)** key.

Inputting Start Times

Assume that you forgot to advance to bib 4 in the start grid, having
left bib 3 keyed into the start. Bib 4 Starts. Since bib 3 already has
a start time, the 4000 prints out the Start Time preceded by ???

???   000000000000

The machine is telling you that a Start Time is already assigned to
Bib 3, so what should it do with this one? This start time belongs to
Bib 4, who is now on course. **Put bib 4 in the Start Grid (Green
Window) and press the (D) key.** The **4000** responds with:

INPUT STARTTIME

Now key in the Start Time exactly as it was printed out next to the
question marks above. Again, **enter the time down to 1/1000th. of a
second, and confirm the entry with the (.) "yes" key.** An "L" will
immediately appear in the Start Grid next to 004, and if bib 4 is
keyed into the red Finish Grid, a running time for bib 4 will appear.

This mistake is common for "low-time" operators. **You must always
remember to have the next number to start keyed into the Start Grid,
ready to go.**

Until you are familiar with the **4000**, you might want to hold the next
racer at the start until bib 4 finishes. This will allow you to input
the start and finish times after the racer has completed his/her run.
This can be done for an entire race for example, if necessary, or you
can use the **4000** to calculate hand times at the end of an event.

Note that you cannot associate a time for a bib that already has a
start time associated to it. You must first **clear out** start times
before new ones can be input.

Clearing Start Times

You now have bib 5 ready to take the start. Assume however, that as
bib 5 is placing his/her poles over the wand, the start gate is
accidentally activated, thereby associating bib 5 with an incorrect
start time.

The **4000** beeps when it receives a start or finish pulse, and in the
case of start signals an "L" appears next to the bib in the Start
Grid. This "L" should **not be associated with a bib if you have not
started that bib number.**

In this case, you wish to clear out the start time associated with bib
5, as it is incorrect. **Press the orange "clear" key located in the
green keyboard area.** The 4000 prints as follows:

> 005 ST 00:40:58.81.8
> DELETED

This indicates that the start time for bib 5 has been deleted, and you
will notice that there is no longer an "L" next to 005 in the start
Grid. You are now clear to really start bib 5.

This technique is also required for RERUNS. Notice however that **even
if you make a mistake** clearing out a start time for any bib number,
the time is not lost. The 4000 always prints what it does, so you
could use the time if it turns out to be valid.

The First Run

Timing the First Run produces the run times for each bib number based
on associated Start and Finish Times. In all cases, work with a start
list, or keep a list yourself. The key is to control the situation by
always knowing **who is IN THE START GATE, and who is NEXT TO FINISH.**

In the First Run, the bibs appear in order, therefore keying in the
next to start in the start grid is accomplished by advancing the
number by one. If a racer does not Start, simply go on to the next bib
number in the start grid.

You must keep track of **who is IN THE GATE, and who is NEXT TO FINISH.**
Our technique is to CIRCLE the racer number who is IN THE GATE, and to
CROSS OFF the bibs as they show up at the finish. This way, the
operator knows at a glace which bib should be keyed into the finish
grid.

CHECKING THE RUN TIME FILE

At the completion of the first run, you should take a look at the top
10 Run Times. With any bib number keyed into the finish grid, **press
the (F) key.** The **4000** prints as follows:

CLASSIFICATION

RACING POINTS?

Respond with (No), as we are not interested in points at this stage.

The **4000** prints out:

```
                              NO

                              ALL              (1)
                              GROUP            (2)
                              SINGLE           (3)
                              FIRST TEN        (4)
                              NOT FINISHED     (5)
                              ADD TEAM         (6)
```

Select (4), for Top Ten Results :

The **4000** will now print out the top ten finishers in order of time.
The information includes position, bib number, and RT (Run Time) for
the top ten. The end of the requested results file is marked by the
following phrase:

```
                         ALGE-SPORTS-TIMING
                         TIMEDATA  COMPUTER
                             TDC  4000
```

We wish to look at the top ten to see if we have any glaring errors
before we print out the entire field. If you have made a mistake, and
a bib number is in the lead by an improbable margin, or you have
forgotten to remove the forerunners from the field, this short list
might help.

Correcting and Deleting Run Times

Assume that we have timed forerunners using bib numbers 241, 242, and
243. We must remove them from the official field BEFORE we add the
run to the First Run Memory.

To accomplish this, we will use the (C) (3) key combination. **Place bib
241 (Forerunner 1) in the red Finish Grid, and confirm with the (.)
"yes" key. Press (C), wait for the menu to print out, and select (3),
"DELETE RUNTIME".** This removes 241 from the time file.

Repeat the procedure for all forerunner bibs, in this case 242, and
243.

If you wish to **ENTER** a run time for **any bib**, simply put the bib number
in the red finish grid, **Press (C), and select option (2): INPUT
RUNTIME.**

DISQUALIFICATIONS AND OTHER CORRECTIONS
The (C) Key

You should be getting the message that the **(C) key** is a good friend to
have and understand well. Let's take a close look at what it can do.
Key in any bib number (to be safe select **bib 250, or one that is not
in the race),** confirm it with the (.) "yes" key, and then press (C).
The menu that is presented looks like this:

```
INPUT FINISHTIME     (1)
INPUT RUNTIME        (2)
DELETE RUNTIME       (3)
INPUT STORE          (4)
DISQUALIFICATION     (6)
EXIT                 (NO)
```

We already know about options (1), (2), and (3).

Option (4), INPUT STORE allows you to enter or change a runtime that has already been added to the First Run Memory, during the second run. We will discuss it further in the section on the second run.

Option (6) DISQUALIFICATION, is of interest to us now however. If you **press (6),** the 4000 responds with:

INPUT NUMBERS
END WITH 'NO"!

If your competition jury is able to disqualify certain racers on the first run, enter their bibs now in any order. In this case, you will disqualify bibs 5, 8, 13, and 54. Enter them using the red area keypad, **confirming each bib using the (.) "yes" key.** Your printout should appear as follows:

005   DISQUALIFICATION

008   DISQUALIFICATION

015   DISQUALIFICATION

054   DISQUALIFICATION

When you are finished, **press the (NO) key to complete the operation.**

You can also remove Forerunners from the results file using the disqualification function.

Note that even if you make mistakes when using the **(C) key,** you can put back the original times using the **(C) (2) INPUT RUNTIME** or **(C) (4) INPUT STORE** functions. The silver tape keeps a record of your corrections and mistakes.

FIRST RUN RESULTS

With any bib number keyed into the red finish grid, **press the (F) key.** The **4000** prints as follows:

CLASSIFICATION

RACING POINTS?

Respond with (No), as we are not interested in points at this stage. Unless of course you are running a Downhill or Super-G.

The **4000** prints out:

```
                              NO

                              ALL          (1)
                              GROUP        (2)
                              SINGLE       (3)
                              FIRST TEN    (4)
                              NOT FINISHED (5)
                              ADD TEAM     (6)
```

Select (1), for a list of the complete First Run Results file:

The **4000** will now print out all finishers in order of time. The
information includes position, bib number, and RT (Run Time) for the
field. The end of the requested results file is marked by the
following phrase:

```
                    ALGE-SPORTS-TIMING
                    TIMEDATA  COMPUTER
                         TDC  4000
```

You can use this results list to create the Second Run Start List.
Simply take the top 15 finishers, reverse them, and then take the rest
of the field in order of finish. Notice that the **4000** will score the
run, in the case of ties, as required by the FIS: Higher bib numbers
are listed first.

STORING THE FIRST RUN INTO MEMORY

When you are certain that your results file is correct (forerunners
removed, any times corrected if necessary), **store the results** file
into the Results Memory **using the (A) key.**

With any bib number keyed into the finish grid, **Press (A).**
  The **4000** will ask:

```
                    ADD RUN TO STORE?
```

Respond with the (.) "yes" key. The **4000** will confirm:

```
                    01 RUN(S) STORED
```

You may now turn off the machine between the runs, without loss of the
first run data. Indeed, should you not be able to remember if the run
has been stored or not, press the (A) key again. The **4000** will ask:

```
                    ADD RUN TO STORE?
```

Respond with the (.) "yes" key. The **4000** will confirm:

```
                    WAS ADDED
```

You must add the First Run to Memory before going on to the Second
Run, and you cannot store the same run twice!

SECOND RUN PROGRAMMING

You must turn the 4000 off between the first and second runs, if only for a moment.

CAUTION: We strongly suggest that the 4000 be readied for the second run well in advance. In this way, should you make a mistake in programming for the second run (such as wiping out the first run results memory), you will have plenty of time to input the first run times again manually using the (C) (2) key combination. In all cases, proceed carefully while programming the 4000 at start-up.

Programming for the second run proceeds as follows:

```
                         ALGE-SPORTS-TIMING
                         TIMEDATA  COMPUTER
                               TDC   4000

                         01 RUN(S) STORED

                         CLEAR STORE?
```

Respond with (No).

```
                         STORE SAVED

                         PRECISION    1/100s
          .
                         SPLIT                (1)
                         SEQUENTIAL           (2)
                         RALLY                (3)
                         SPLIT-SEQUENTIAL     (4)
```

The 4000 confirms above that the store is saved, and based on how you programmed for the first run assumes the dame degree of precision (1/100s). The Timing mode menu is also limited by the programming choices made in the first run. You will again **select option (1) SPLIT.**

```
                         SPLIT

                         max. 250 STARTERS

                         START AS PER BIBO?
```

For this demonstration, let us assume that we are running only one race at a time, ie. Men or Women only. (There is a section that covers "Combined Races" for Men and Women further on in the text.)

We are therefore interested in the **correct bibo sequencing of bibs at the start gate,** and since all times on file in the First Run Results Memory are concerned with only one race, we can ask the **4000** to present the bib numbers in the green start grid in the correct bibo order, thereby saving the operator many key strokes.

Respond with the (.) "yes" key to use the bibo feature.

HOW MANY REVERSE ?

The **4000** needs to know, based on the level of your event, how many of
the first group should start in reverse order of their First Run
Times. Because FIS rules (this year at least) require that the **top 15
be reversed** (Art. 3.1 Precisions), you will **respond with (1), (5),
then (.) "yes".**

15

DIFFERENCE TIMING(1)
ABSOLUTE TIMING (2)
SECONDS ONLY (3)

Select Option (1), Difference Timing

DIFFERENCE TIMING
INPUT 'TIME OF DAY'

The **4000** above confirms that difference timing has been selected, and
prompts you for the time from which the internal clock should start.
'TIME OF DAY' for simplicity sake can be zero, thus **respond with
(.) "yes" to enter all zeros as the 'TIME OF DAY'**

TIME OF DAY
00:00:00.00.0

START CLOCK AT
SYNCHRON TIME!

Now **press either the green (start) button, or have your starter open
the start gate.** When a start signal is received, the 4000 will respond
with:

READY FOR TIMING

****

You might want to check your paper roll supply at this stage, to
ensure that you have enough to make it through the second run.

SECOND RUN OPERATION

Once programmed for the second run, if you have selected the bibo
option, the 15th place competitor from the first run will be shown in
the green start grid. At this time, you can scroll up or down through
the field by setting the toggle switch to the **Up arrow**, or **Down arrow**
position, and advancing or descending with the **gray (1) key.** The
start order that unfolds in the start grid should match the Second Run
start list.

Even if it does not, due to some error in the First Run Results File,
you can always select any bib number from 1 to 250 by setting the
toggle switch to the manual position, and using the gray 100, 10, 1,
keys to advance to the desired bib.

It is convenient however to have the bibs, although all mixed up, presented automatically by the bibo option. To accomplish this, after each racer starts, place the toggle switch in the UP Arrow position, and advance the bib number by 1 using the gray 1 key. The next bib number based on the bibo First Run Results File will appear in the start grid.

SECOND RUN FORERUNNERS

Deal with them in the same manner as the first run. Select a series of bib numbers that are not in the race (241, 242, 243 for example), set the toggle switch to the **manual position**, and **key 241 into the start grid using the gray 100, and 1 keys.**

Start the first forerunner and**select 241 (followed as always by the (.) "yes" key) in the red finish grid.** Confirm that the **Memory/Automatic toggle switch** in the red keyboard area is set to **Automatic**

An "L" will appear next to 241 in the start grid. Advance immediately to the second forerunner bib 242 by **keying in 242 using the gray 100 and gray 1 keys,** leaving the toggle switch in the **manual** position.

Start the second forerunner bib 202, and wait for bib 201 to finish.

As bib 201 finishes, the time will be calculated as usual. Now **key in 242 in the red finish grid,** as the next to finish. Confirm with your starter that 243 is in the start, and**check that you have 243 keyed into the green start grid.**

Get all forerunners down the hill before you start the race in earnest.

SECOND RUN RACE TIMING

Place the correct bib number in the start grid using the gray 100, 10, 1 keys. In this case, let us assume it is bib 42.

Start bib 42 when you are ready, **set the toggle switch to the up arrow position, and press the gray 1 key.** The next logical start bib based on the Reverse 15 bibo will appear in the start grid. (Let's assume bib 34) Return the toggle switch to the **Manual** position.

Key bib 42 into the red finish grid, followed as always by the (.) "yes" key to confirm. Check with your starter that you have the correct bib number in the start grid, in this case bib 34. Start bib 34.

As bib 42 finishes, notice what the **4000** does:

```
042  ST  00:00:39.73.6
     FT  00:01:26.19.4
     RT  00:00:46.45
     TT  00:01:32.06
```

It prints out the calculated run time based on the start and finish times as they relate to the internal clock, but it also gives you the combined total time TT, based on the total of the First Run and Second Run times.

On the gray display area, the total time appears. **If you would like to look at the second run time, Press the (E) key.** Return to the total time by **pressing the (E) key again.**

Conduct the second run as you did the first. Keep careful track using the start list of **who is IN THE START, and who is NEXT TO FINISH.** If you are not certain, use the **Finish Memory Switch,** and associate finish times to bib numbers using the **(E) and (next) keys.**

Because the **4000** is calculating the total time as well as the run time, you must wait a little longer before keying in the next bib number to finish in the red finish grid. Notice that for display purposes the **4000** needs about 4 seconds after a finish pulse is received before the keypad in the red finish area becomes effective again. Don't rush it. Allow the machine to do what it has to accomplish, and then proceed to the next bib number.

Upon completion of the second run, immediately remove the forerunner times, deal with disqualifications, and check the Top Ten Finishers before moving on to the complete combined Time results of the whole field. Just as after the first run, it is a good idea to look at the first ten to see if you have made any major timing errors that can be corrected before printing the Final Results timing data. **Refer to CHECKING THE RUN TIME FILE and DISQUALIFICATIONS AND OTHER CORRECTIONS The (C) Key,.**

FINAL RESULTS WITH RACE POINTS

DO NOT ADD THIS SECOND RUN TO THE INTERNAL MEMORY USING THE (A) KEY. You want to print off the Race Timing data before you add the run to store, if at all.

With any bib number keyed into the red finish grid, **press the (F) key.** The **4000** prints as follows:

CLASSIFICATION

RACING POINTS?

Respond with (.) "yes" for Race Points to be scored using the FIS formula and Constants for each discipline,

The **4000** prints out:

```
                    *** RP ALPIN ***
                    INPUT F=VALUE
```

It is asking you to tell it what type of race you are running so that
it can use the correct constant in the Race Point Formula as
prescribed by the FIS. In this case, let us assume we are conducting a
Slalom Event. Input 670 as the F VALUE. (A complete F Value list for
each discipline as of January 1988 is included on page 19). **Confirm
your choice with the (.) "yes" key.**

The **4000** prints:

```
                    F= 0670

                    RUN              (1)
                    STORE            (2)
                    TOTAL            (3)
```

It confirms 670 as the selected F value, and now asks you what part of
the event should be used in the calculations: The Second Run (RUN),
the First Run (STORE), or the Combined Times of both runs (TOTAL).
Select Option (3) TOTAL.

The **4000** prints:

```
                    TOTAL

                    ALL              (1)
                    GROUP            (2)
                    SINGLE           (3)
                    FIRST TEN        (4)
                    ADD TEAM         (5)
```

It confirms that the Total of the two runs will be scored, and
presents you with the various options. **Select (1), for a list of the
complete Total Time Results file:**

The **4000** will now print out all finishers in order of time. The
information includes position, bib number, * (First Run Time), RT
(Second Run Time), TT (Total Time after two runs), and RP (Race
Points). An example would be as follows:

```
Finish Position                      6.
Bib Number and First Run Time     001  * 00:00:50.15
Second Run Time                        RT 00:00:41.76
Total Combined Time                    TT 00:01:31.91
Race Points                       RP   00012.31
```

The end of the requested results file is marked by the following
phrase:

```
                    ALGE-SPORTS-TIMING
                    TIMEDATA  COMPUTER
                        TDC  4000
```

You may print off as many of these result listings as you wish. The limit is defined by the amount of paper you can afford to waste. You might also want to get a list of the DNF (Did not Finish). If you make a mistake and end up requesting more results than you want, simply turn off the printer using the printer switch.

Note: The Time data Results file is available for transfer to a computer text file via the parallel data out port. With the printer off, the data is transmitted at 9600 baud, and can save you a great deal of work as far as data processing is concerned. Contact us for complete details on Time Data Transfer.

DID NOT FINISH LISTING

As with the first run, you can generate a listing of all those who did not finish by using the (F) key again. **With any bib number keyed into the red finish grid, press the (F) key.** The **4000** prints as follows:

                         CLASSIFICATION

                         RACING POINTS?

Respond with (No).

The **4000** prints out:

                         NO

                         RUN   (1)
                         STORE   (2)
                         TOTAL   (3)

Select option (1), meaning that you wish to use time data concerned ONLY with the Second Run

                         RUN

                         ALL   (1)
                         GROUP   (2)
                         SINGLE   (3)
                         FIRST TEN   (4)
                         NOT FINISHED (5)
                         ADD TEAM   (6)

Select option (5) NOT FINISHED

The **4000** will print a listing of those bibs who have start times, but no finish times, reasoning that they have not finished. Example:

                         NOT FINISHED:

                         007
                         008
                         010
                         023

Note that this DNF capability is only provided when you select **RUN**. It is not available if you select b**STORE** or **TOTAL**.

SHUT DOWN AND DATA MANAGEMENT

When you are certain that the results are printed out as required, and you have copies of the time data that you need, you can either add the second run to the First Run Memory, thereby preserving at least the Combined Time data just in case, or turn the **4000** off without saving the second run, and call it a day. **If you want to save the second run, use the (A) key to add the run to store,** but realize that when you turn the machine off and then on, that any subsequent results listings **will not include a breakdown to second run, first run and total time.** The **4000** will only provide you with a record of the **total combined time.**

This is why you do not add the Second run to memory immediately after the Second Run.

MEN`S AND LADIES "COMBINED" EVENTS

The **4000** can handle men's and ladies divisions, but there are some very important guidelines that you **must** follow.

In selecting split mode, we are limited to bib numbers from 1 to 250. when you assign bibs for the race, try not to have the ladies and men's bibs overlap. If they do overlap, the **4000** will not be able to distinguish between bib 1 ladies and bib 1 men.

If you are faced with bibs that overlap, assign the smaller field of the two a prefix such as "2" or "1". We often assign ladies bibs with "2" and then the bib number. This means that the **4000 thinks** that the ladies bibs are 201, 202, 203, 204, etc., when in fact they are 1, 2, 3, 4, etc., same as the men.

We have to do this to accommodate the manner in which the 4000 times in difference mode, associating bibs to start and finish times. **We simply cannot have bibs that overlap.**

In effect, you have two races going at the same time, but you will separate the "groups" (men/ladies) when it comes time to print results.

A few features of the **4000** are adversely affected.

The "position" that is indicated in the gray display window as racers finish will now not be entirely correct. This position feature is based on **ALL** times in the machine as a racer finishes.

The bibo feature for the second run simply cannot be used. If you ask the **4000** to reverse 15 for example, it will take **ALL** racers, men and ladies, into consideration.

This means that you must manually index each bib number as they present themselves at the start for the second run, without the aid of the **4000**.

The major difference is in results printing. In every case, when the **4000** asks:

```
ALL           (1)
GROUP         (2)
SINGLE        (3)
FIRST TEN     (4)
NOT FINISHED  (5)
ADD TEAM      (6)
```

Select (2) GROUP.

The **4000** will prompt you for the ranges of the bib numbers to consider for each group. The men are a group, and so are the ladies. Print off the results as you normally would, but pay attention to the bib numbers that you use for each group definition.

FIS Alpine Race Point Formula

When you print off results for some Alpine races, you may require the calculation of Race Points based on Total Time (Slalom and Giant Slalom) or Run Time (Super-G and Downhill).

The **4000** prompts you for the F=Value when you ask it to calculate Race Points. This F=Value is a constant in a mathematical formula that is prescribed by the FIS. The F=Value that you use depends on the event that you are running, and the table below lists the values according to each event. The Formula is also included for your interest.

Event	F=Value Constant
Downhill	1180
Super-G	940
Giant Slalom	920
Slalom	670

Note: Information on Race Point Formula and constants valid as of January 1st., 1988. Pay close attention to FIS directives issued through your national ski association, and stay current.

THE NEW ALPINE FORMULA

$$P = \frac{F - Tx}{Ty} - F$$

P =   Race Points
F =   Constant Listed Above
Tx =   Winning Time in Total Seconds
Ty =   Time of Racer in Seconds

The 4000 prompts you for the F=value because in recent years this
constant has been changed many times. Should future rule changes
issued by the FIS require that new constants be used in the formula,
the **4000** can easily accommodate these demands without changing the
main program chip.

Should you have any questions concerning **ANY** FIS Rules that pertain to
Alpine skiing or timing, please contact the Canadian Distributor of
ALGE SPORTS TIMING in Montreal at (514-933-0895). A licensed FIS
Technical Delegate is on our staff, and would be glad to help you in
any way possible.

Summary of Function Keys

Here is a short list of what the **Function Keys** do. You might want to
copy them down and attach the list to the **4000** as a handy reference.

A	Adds Run to Memory	B	Special Functions
C	1 Enter Finish Time	D	Input Start Times
	2 Enter Run Time		
	3 Delete Run Time		
	4 Input Store		
	6 DSQ		
E	Assigns Finish Time in	F	Results
	Finish Memory to Bib #		
	Red Window		

Re-Runs

Should the necessity arise that a re-run for a bib number that **already
has a time** be required, you must clear out the run time and the start
time prior to starting the racer a second time. Follow these steps.

Assume that a racer has finished, has a time, but for some reason is
granted a re-run (provisional or otherwise).

Since the 4000 has a Run Time on file, you must first **delete the run
time using the (C) (3)** combination.

When the re-run bib appears at the start, notice that when you put the number in the **start grid** an "L" is beside the number signifying that a start time is **already associated** with this bib. This is the start time of the previous run for this bib number and **must be cleared out using the "clear" key** prior to starting the re-run.

If a racer gets a re-run without finishing a previous run, then no time is stored in the Run Time Memory. In this case you will simply have to clear out the start time only.

Printer Operation

The Printer that is integrated into the **4000** is of the Parallel variety, and thus actually slows down the operation of the timer as it waits for the printer to "catch-up".

It uses thermal metal paper that is available through us, or if you are caught short, is available at Radio Shack (# 26-1412).

If this printer jams, the timer stops normal operation until printing resumes. If this happens, you can **turn the printer off using the switch on the back panel.** You can also preserve printer paper by turning the printer off during programming or some timing modes. be careful however to turn the printer off **only** in circumstances that warrant such action, as all information is not available (such as missed Finish Times or Start Times) when the printer is turned off.

Photocell Techniques

You will note that there is a small screw located in the red section of the timer, with numbers ranging from 1 to 6. This is the adjustment for the "dead time" after the photocell is triggered by a finish. The dead time ensures that unwanted extra signals generated by poles, the second foot or arms, are not recorded by the timer.

By adjusting the "dead time" to the 3 or larger position, we pretty well assure that only one impulse/skier will be recorded. You may not however want to set the screw to the 6 position, as the "dead time" in this case is 2 seconds, and a competitor following close behind, will not be timed.

Another consideration is that you should carefully asses on a continuous basis, the height of the photocell **beam** in relation to the snow. Try to anticipate the position of the competitors when they cross the finish line. Many installations have fixed supports that may not cover the entire range of snow depth during the season. We have experienced racers that fall near the finish and **slide under** the beam because it was set too high. (One of the many valid reasons for using hand timing despite the amount of money spent on these "boxes".)

A NOTE ABOUT SAFETY. The photocell is really the only device that should be placed in the path of the skiing public and racers. In every case, you should pay very close attention to the manner in which the photocell system is installed **and protected.** Too often we get wrapped up in the timing installation without realizing that the Finish Line installations are not properly protected. In fact, the major concern should not be protecting the equipment, but **protecting the skiers.**

At some point in your timing career, some skier, racer or otherwise, will have a head-on collision with the finish installations. You must operate on the basis that this is inevitable, and protect the skier from injury as best you can.

Special Features and Functions
The B key

A list of instructions that refers to the special functions of the **"B"** **key** is located at the front of the **4000 general instruction manual.**

These special functions have been developed in response to special requirements that we have in timing World Cup events, and we would suggest that you avoid them until you really need them.

It is important to note that any modes that you select using this key will drastically affect the manner in which the 4000 operates. This will probably seem foreign to you should you have become used to the machine in "normal' split mode.

Experiment with these special functions **before** you operate under race conditions.

Using The 4000 with a Display Board

Refer to the separate instructions on the complete functions of the Display Board, prior to reading here. You should however come away with the following basic principles:

1- **ALWAYS** power the board first, then send signal from the timer.

2- The two switches and the drum wheel **on the bottom of the display board** must be properly set.

3- There are many "modes" of operation that are selected primarily by the manner in which you power the display, and how the Din plug on the back of the 4000 is inserted.

The Display should be powered by a **battery** that is well charged. Any automotive 12 Volt battery will easily do the job, as the display draws very little power to operate. (100ma quiescent current). This means that even if you leave the board running for **days** at a time in -25°C weather, it will still work. Have a little faith, and avoid using chargers while the display is in use. Remember that the display is **connected to the timer,** and any irregularities and noise on the 110 Volt charger line **will be transmitted to the timer.**

At the very least, you risk messing up the communication signal from the start. A nice filtered DC power supply is acceptable, but disconnect it should you note any problems that can be traced to use of the display.

The display should be **powered up first**, then the **signal from the timer** should be connected. This ensures that the display does not get confused. Like any computer device, basic principles of operation apply. In this case, **POWER bofore SIGNAL**.

When correctly powered up, **the display will spell "ALGE"**; part of a self-test routine that indicates everything is OK. Get the board to this stage before proceeding.

The signal from the timer is connected on the board to the two yellow jacks that accept banana plugs. They are located on the right side of the display. When you are using only one display, polarity is not important. For multiple display operation, polarity is important, and the ground ($\perp$) jack is the lower one.

At the timer end, plug the din plug into the jack marked "data out 2". Note the direction in which the screw on the din plug is pointing, as the plug can be inserted with the screw to the right or to the left.

The **4000** puts out two types of signals depending on how the din plug is inserted. You can have the display "mirror" the gray window of the timer, or you can have the display show only the last time calculated.

In the "mirror" mode, or "running time" mode (same thing), the display shows spectators the elapsed running time for each racer on course as the bib is keyed into the finish grid (red window). You can look up the hill and refer to the position of the racer at a certain gate or point, and then look at the time running on the display. You know instantly if the skier is doing well or not. (Note: You **must** be using the **4000** in **"Automatic"** finish mode for this running time to be displayed). As each competitor finishes, the display instantly freezes, and the tenths and hundredths of a second are added to the display (they blank out while the time is running so that they don't shake the board to bits!)

In "Stop Time" mode, the display is always showing the **last Run Time"** received from the **4000**. The advantage here is that the competitor has more time to absorb the information. In the previous mode, as soon as you key in the next bib number, the display shows the running time of the next racer to finish. Here, the display never runs. It only shows static times for finishers, and **only changes when another time is calculated as a racer finishes**. Spectators don't like it as much, but the racers seem to understand it better.

The choice is yours, but realize that **the running time option will not work if you have the memory/automatic switch in the memory position**. Note that if you are keying in bib numbers after racers finish using the (E) (next) combination, the display will not show running times regardless of how the din plug is inserted in the **"data out 2" jack** on the timer.

The **memory/automatic switch must be set to automatic,** and you must key in the bib numbers prior to finish line crossing for running time to be displayed.

Should the display perform erratically, the voltage is probably dropping from your power source. The board will operate on anything from 12 to 24 Volts, but don't expect wonderful performance if you feed it 11.9 volts. It is sensitive to voltage, and needs 12 Volts to do the job. This condition is rare however, and is easily corrected. Even if the power supply to the board fails, and the boards ceases to function, this will not affect the **4000** and/or timing operations.

As a rule, you will find that even the coldest weather will not affect performance, and rain is not a "board-breaking" event. Make certain however that condensation does not form during storage, and that when the display is taken inside, that it is allowed to warm up and dry prior to storage or further operation. The "cool dry place" adage applies here as to all electronic components, and your warranty does not cover damage from condensation on any **ALGE** component or device.

Updates and New Developments

Alge is constantly updating the capabilities of the **4000**, and thus, each year we make the new Eprom Chip available to our **4000** clients should they wish to upgrade.

The cost is $ 150.00, and includes installation FOB Montreal.

This proceedure should only be necessary if **major** changes in the FIS rules arise. In every case, should new developments warrant changes of the main Eprom, you will be notified.

If the **4000** is to be used for other types of events, contact us first to see if any new developments will affect or enhance your next project. In every case, we hope you will find our support and service of the systems that we sell to be of the same high quality as the **ALGE** components you have purchased.

Your comments on this manual, and/or on the system itself, are encouraged and appreciated. We try to provide the most complete information on each application as is possible, and draw mainly from practical, field tested experience. Your experience and knowledge in the sport warrants attention, so drop us a line should you have anything to share.

You can reach us at the following address and numbers:

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