**FÉDÉRATION INTERNATIONALE DE SKI**
**INTERNATIONAL SKI FEDERATION**
**INTERNATIONALER SKIVERBAND**

# TIMING BOOKLET

## Edition 1.0

**With homologated equipment 1999**

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# WHY A FIS TIMING BOOKLET ?

Why a FIS Guide when everything is running smoothly?

Advances in sports technologies have created the necessity to improve and standardise the process of using newly developed timing equipment. If not used knowingly, such equipment would not guarantee perfect accuracy and precision. This remark mainly concerns computers which have more and more often been used as timing devices, in opposition to logic, as time should be timed and not calculated.

The FIS Working Group has therefore contacted all manufacturers of timing equipment, to determine whether the accuracy of their timing equipment conforms to requested standards to guarantee timing measurements at 1/100 second. It is important to point out that for a 1/100 second accuracy, the timing device should be able to time the 1/1000 second.

For that very same reason, it should never be proposed an official timing at 1/1000 second, as this would mean a timing at 1/10'000 second which is nonsense in timing skiing competitions, as well as other timed sports competitions.

The survey which the Working Group has thoroughly carried out, enables the creation of a list of timing equipment and systems, which, when properly used and kept in good repair, guarantee the FIS Technical Delegates, Coaches, and athletes an accurate timing which agrees with the homologation standards.

This list should be part of the FIS Guide in order to meet the expectation of Sport in general and the users in particular and not to penalise any timing equipment manufacturers.

In the forthcoming years, the same homologation process will apply to the key component of the timing device, such as impulse captors, starting cell, starting gate, etc., as well as on wireless transmissions, which are important for 2$^{nd}$ level competitions, and in particular for training sessions.

The explanatory document "Wireless System" proves the dexterity of the Working Group members.

Daniel BAUMAT
FIS- TWG Chairman

# FIS TIMING BOOKLET
# FIS ALPINE TIMING GUIDE

All timing devices used must be homologated as per the list page 20.

Races using devices not mentioned on that list will not be considered for FIS points.

## EQUIPMENT SET-UP (see drawings):

### Start

**Starting Gate**

Minimum of 2 electronically isolated contacts activated by 1 wand. Timing wires ❶ & ❷ must be connected to separate start gate contacts. The wand must be installed so that starting is impossible without it opening.

For FIS events, Wireless Time-of-Day Data transmission by radio ⓫ is permitted for use as the back-up System B timing system only if the System A timing wires ❶ are connected to one starting gate contact and a homologated Time-of-Day Timer is connected to the other starting gate contact ❷.

**Starting Clock**

Must be connected on the starting gate for synchronisation, if used.

**Voice Communication**

Timing impulse and voice communication functions must be separated on different wire pairs if manufacturer's specifications dictate.

If radios are used for voice communication, a dedicated channel must be used.

**Timing Cables**

Make sure that cables cannot be torn out at the start by a competitor, or by any other person next to the starting area.

**Cells at intermediate time**

Locate Cells carefully in co-ordination with the Technical Delegate and/or the Race Jury.
To avoid the cells being triggered by anyone other than the competitors, it is recommended that the person responsible for that intermediate timing point use a push-button to arm the photo cells only when a competitor crosses the line.

**Cells at the finish line ❸ & ❹**

It is recommended to level the finish area.
Locate Cells carefully in co-ordination with the Technical Delegate and/or the Race Jury.

There are two categories of cells:

**1. Reflector Type:** Both transmitter and receiver are on the same side and use a reflector on the other side.

**2. Transmitter-Receiver Type:** Transmitters can either be on opposite sides or on the same side, depending on the manufacturer's specifications.

The cells must be connected to the timing devices by wire. No radio transmission is allowed.

In all cases, max. vertical separation of the beams cells may not exceed 20 cm. (+/- 8“)

# TIMING DEVICES

**System A** Start line ❶ and finish cell ❸ must be connected.

**System B** Start line ❷ and finish cell ❹ must be connected.

**System B ⓬** For FIS events only, the start line may be connected through radio transmission and cell ❹ for finish is connected by wire to System B

**Manual hand timing** In all cases hand timing is compulsory.

Stopwatches, with or without printers, should be synchronised to the time of day and used at the start and at the finish.

A complete list of hand times recorded at the start and the finish must be given to the chief of timing at the end of each run, or immediately upon request.

**Synchronisation** All elements of the timing installation, must be installed and be in good working order at least one hour before the beginning of the competition. Timers should be turned on 30 minutes before synchronisation to allow the quartz time bases to stabilise.

Synchronisation must be done 30 minutes prior to the start of each run and must not be re-synchronised while the run is in progress.
The synchronisation impulse for all timers must come from the start gate. One minute after synchronisation is done, a new impulse must be sent by the start gate to check synchronisation accuracy on Systems A and B.

Should any important discrepancies be observed when this check is performed, synchronisation should be redone and checked again prior to the start of the run.

Manual stopwatch synchronisation must be done before or together with the synchronisation of the whole system.

**Competition in progress**

## Reminders

In case of timing problems, the chief of timing must inform members of the jury or the finish referee immediately.

Starter and official timekeeper should agree upon using specific terms and commands during communication. This dialogue should be short and precise, as well as systematically repeated for each competitor. In all cases it is recommended that the starter always informs the timekeeper(s) at the finish as soon at a competitor leaves the start.

At the end of each run or competition, before sending out the results, times and ranking from the timing systems and the computer results system must be compared and cross checked for accuracy

## Notes

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At the end of the competition, it is compulsory to give the Technical Delegate the enclosed "Timing Report Form", as well as the printed tapes from the System A, System B and all hand timing records.

# Wireless Transmission System B only

The FIS Timing Working Group recognises the importance of allowing emerging and technically responsible technologies to be used in modern FIS events. For this reason, and because of the flexibility that it affords, FIS level events (but not Continental Cup, National Championships or World Cup) may use radio Time-of-Day data transmission technology, and certain homologated impulse transmission systems for use as the System B.

In all cases, radio data transmission of start times, and impulse transmission may only be used for System B if system A uses hard wiring to the start.

This allows race organisers to use many types of radio data transmission technology that is available world-wide at very reasonable cost, in conjunction with any timer on the approved FIS List. The radio data transmission systems, since they act as a conduit for data transmission, and not as a timer, do not need to be homologated.

Impulse transmission systems are more critical timing components and only those that are homologated for use as system B components may be used.

The transmission of the system B start times through radios allows for the recovery and/or retransmission of start time data if the radios fail to make contact on the first attempt. Radios can be influenced by many factors like environment, topography, high voltage power lines, radar stations, or other radios even if they are not on that same frequency due to the effects of harmonic interference. Every situation will be different and the most important aspect of this set-up example is to ensure that the start times produced by System B are available for use if needed regardless of what happens at the radio level.

For this reason, every time that is eventually transmitted by radio must be stored in a timer at the start before it is transmitted.

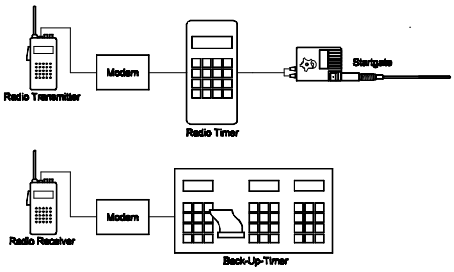
### Where is Wireless Transmission **Allowed?**

- Wireless transmission is only allowed for start times, not for finish times (only time of day).
- A radio system is only allowed as a Back Up System (System B), and only if a hard-wired System A is in place.
- A radio system as a Back Up System is not allowed for Olympics, World Championships, World Cup, Continental Cup, and National Championships.
- The timer used at the start, linked to the radio, like a normal timer must be synchronised with the System A timer at the finish in time of day.
- The Start-timer must be a FIS-approved timing device.
- Using a start timer, it must be possible to save every start time.
- A display of each start time to the 1/1000th sec. must be available by bib number at the start at any time during the race.

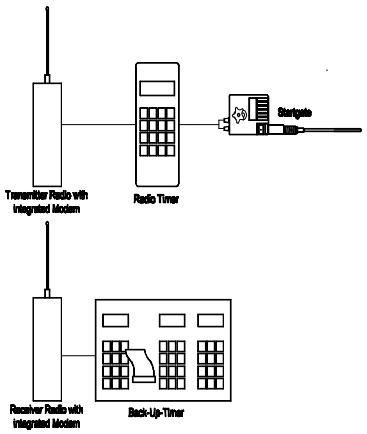
Please refer to the set up diagrams that illustrate the correct use of these radio systems.

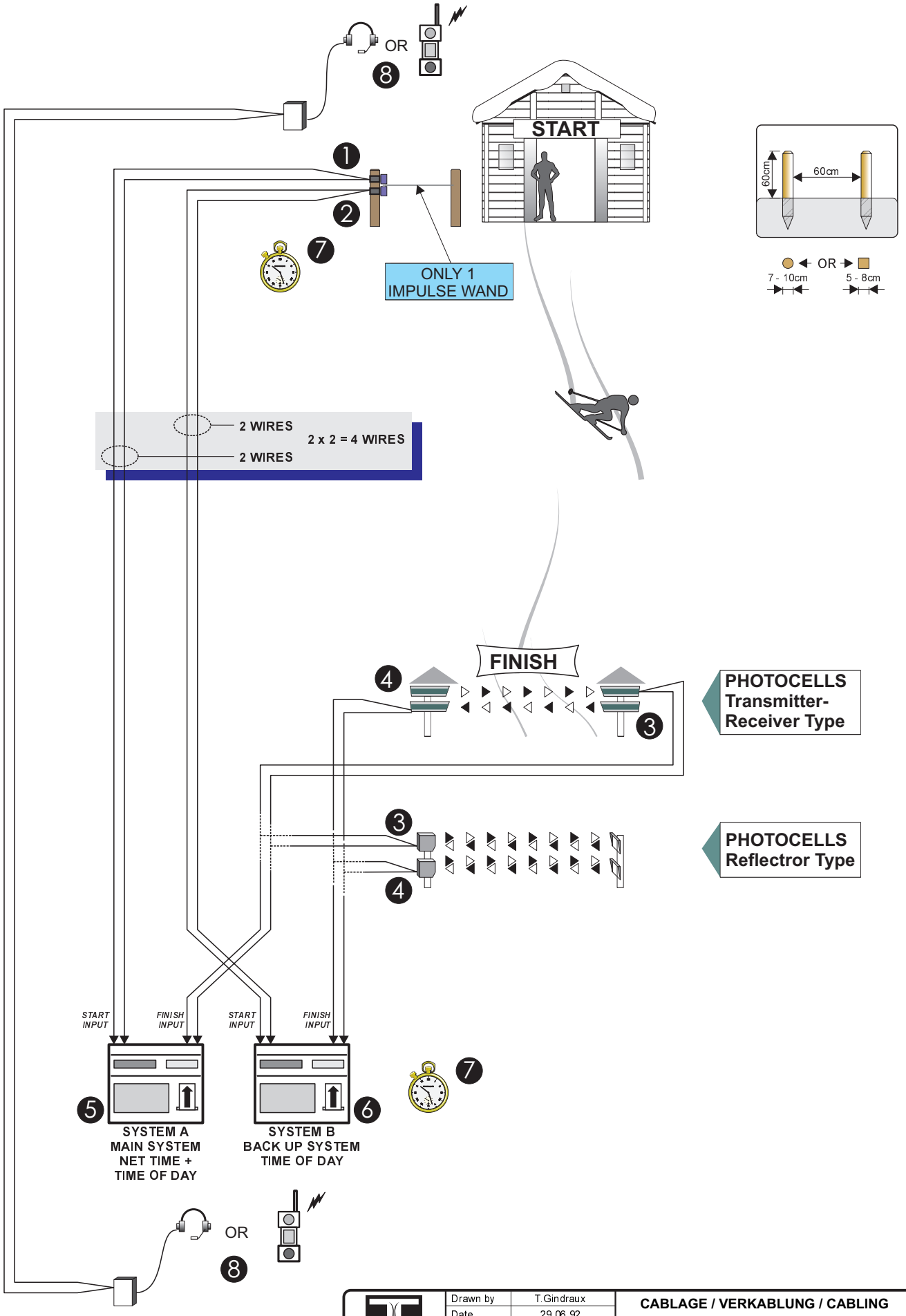
# Set up of the Wireless System at the Start:

System with separate Modem and Radio




System with integrated Modem in the Radio



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| Date | 29.06.92 |
| Checked by | DBA |
| Modified by | 26.05.98 / AV / Rev 1.4 |
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| FISAS005 | Page 1 / 1 |

**CABLAGE / VERKABLUNG / CABLING**

CONTINENTAL RACES & EUROPA CUP CONFIGURATION

**4 WIRES CABLE**

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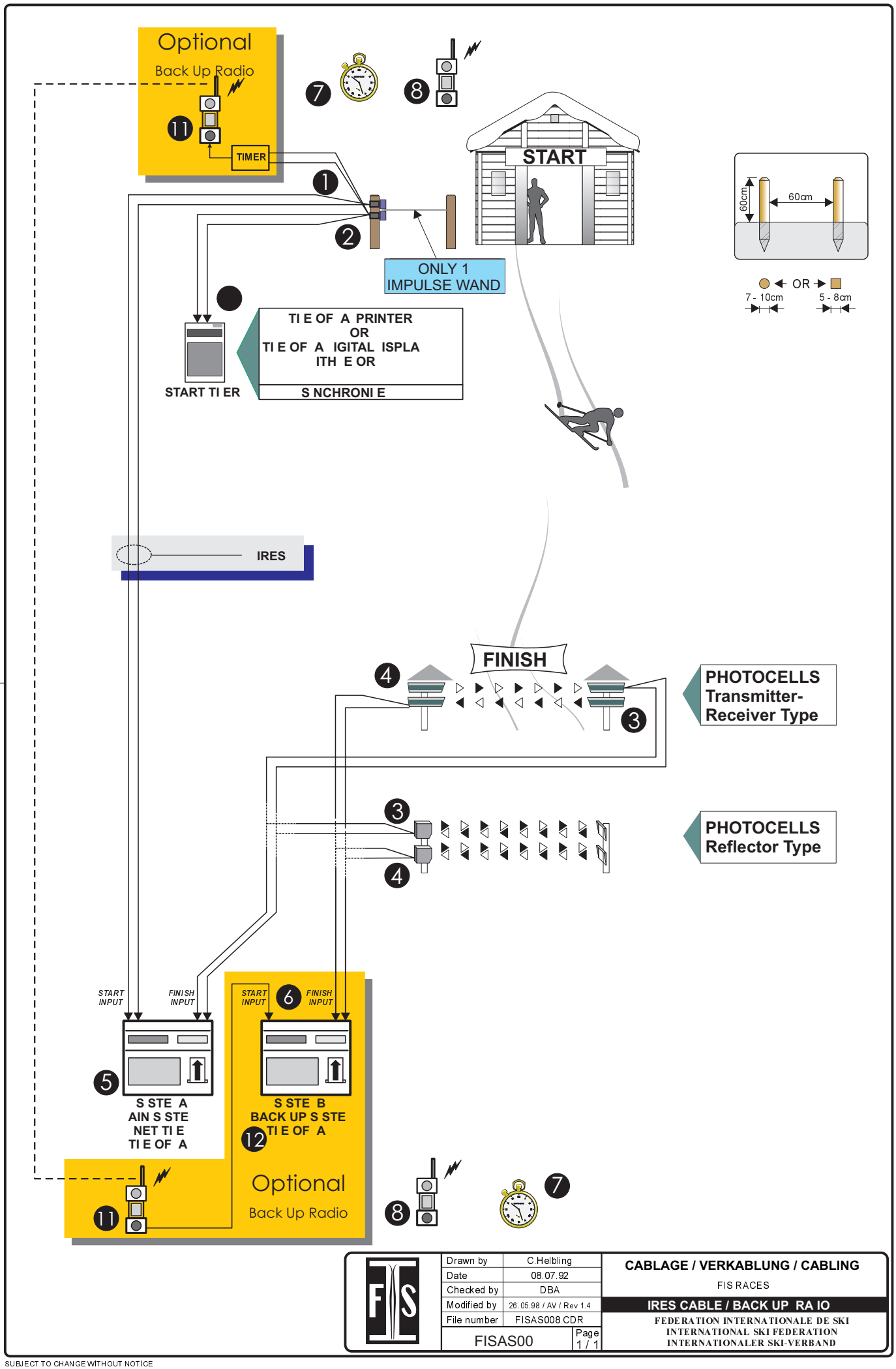


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| Drawn by | C.Helbling |
| Date | 08.07.92 |
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| FISAS00 | Page 1 / 1 |

**CABLAGE / VERKABLUNG / CABLING**

FIS RACES

**IRES CABLE / BACK UP RA IO**

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# ICR (NEW)

**610 Start, Finish, Timing and Calculations**

611 **Technical Installations**

611.1 **Communications**

In all international competitions, there must be multiple communication (telephone or radios, etc.) between the start and finish. Voice communication between starter and finish must be assured by fixed wire connection or radio. In case of radio, this must be on a separate channel from that used by any other function of the ROC.

In Olympic Winter Games and FIS World Championships the communications between start and finish must be assured by fixed wiring.

Except as set out in 611.2.4., all other methods of electronic timing e.g. transmission by radio are forbidden.

611.2 **Timing Equipment**

For all events in the FIS calendar, electronic timing systems approved by the FIS must be used. A list of these approved devices will be published. Races using timing devices other than those on the approved FIS list will not be considered for FIS points.

Specifications and procedures for timing are more fully described in a separate FIS Timing Booklet.

611.2.1 *Electronic Timing*

For all international competitions, FIS World Cup, FIS Continental Cups and FIS competitions, two synchronized electronically isolated timing systems operating in Time-of-Day must be used. One system will be designated System A (Main system), the other System B (Back Up System) prior to the beginning of the race.

All time of day times must be immediately and automatically sequentially recorded on printed strips to at least the 1/1000th (0.001) precision. Both systems must allow for the calculation of net times by the mathematical comparison of each racer's start time to finish time. The final result for each skier's run is then expressed to 1/100th (0.01) precision by truncating the calculated net time on course.

All times used for the final result must be from System A. If there is a failure of System A, a calculated net time from System B must be used following the same procedure as set out in 611.3.2.1. It is not permitted to substitute Time-of-Day times from System B for use with System A for the purpose of net time calculations.

For all events, System A must be connected to its respective start gate contact by hard wire connection. System B must be connected to another electronically isolated start gate contact by another separate pair of wires.

Refer to the FIS Timing Booklet for more details regarding cabling and complete wiring descriptions, diagrams and start gate installations.

All timing equipment and technical installation should be set up or protected in such a way that danger to the competitors is avoided where possible.

Synchronization of the two timing systems must occur within 30 minutes of the Start of each run. Synchronization of the two systems must be maintained throughout the competition. Timers may not be re-synchronized during any run.

611.2.1.1 *Start Gate*

The start gate must have separate electronically isolated switch contacts for triggering the start inputs of both System A & B.

If a start gate requires replacement during a run, it must replaced with an identical start gate in the same position

611.2.1.2 *Photocells*

For all events, there must be two photocell system(s) approved for use by the FIS installed at the finish line. One is connected to System A. The other is connected to System B.

Procedures and regulations for start wands and photocells are found in the FIS Timing Booklet.

611.2.2 *Hand Timing*

Manual (Hand) Timing, completely separate and independent of the Electronic Timing, must be used for all competitions listed in the FIS calendar. Stopwatches or hand-held battery operated timers that are installed at both the start and the finish and capable of expressing times to 1/10th (0.1) or 1/100$^{th}$ (0.01) precision qualify as proper hand timing devices. They must be synchronized prior to the start of each run, preferably with the same Time-of-Day as System A and System B. Printed records, either automatic or handwritten, of recorded hand times must be immediately available at the start and at the finish.

611.2.3 *Score-board*
Organizers shall provide appropriate facilities for continuous visual or acoustic presentation of all registered times of all competitors.

611.2.4 *Radio Transmission*
For International FIS events only, it is permitted to use radio transmission systems as approved for use by the FIS for System B connection to the start.

611.3 **Timing of Finish**

611.3.1 With electronic timing, the time is taken when a competitor crosses the finish line and triggers the beam between the photo cells.
In case of a fall at the finish, the time can be taken without both of the competitor's feet having crossed the finish line.
For the registered time to become valid, the competitor must immediately completely cross the finish line with or without skis. With hand timing the time will be taken when any part of the competitor crosses the finish line.
The finish controller determines the correctness of passage across the finish line.

611.3.2 In the case of a failure of the main electronic timing system (System A), the results of the electronic back-up system (System B) will be valid as per art. 611.2.1. For the Olympic Games, FIS World Championships and FIS World Cup, a synchronized electronic timing system with printers, connected to the starting gate and to the photocells at the finish is obligatory.
In case of a failure in the lines of the timing system between start and finish, this back-up system will allow the calculation of the times to 1/100ths of a second.
In the case that calculated net times from either System A or System B are not available for a competitor, the calculated net Manual Time as per 611.3.2.1 will be considered valid.

611.3.2.1 *Utilization of times taken by hand*
Hand times may be used in the official results after a correction has been calculated.

Calculation of the correction
Calculate the difference between the times taken by hand and the electronic times of the 6 competitors starting before the missing time and the 6 starting after or if necessary the 12 nearest competitors.
The two times showing the greatest differences are eliminated. The sum of the remaining 10 time difference is divided by 10 to give the correction which must be applied to the hand time of the competitor without an electronic time.

611.3.3 The official timing strips from the printer will be given to the Technical Delegate. They will be kept until the official approval of the race or after any appeal dealing with timing or race results.

A Technical Timing Report Form as prescribed by the FIS must accompany the race results and must be reviewed and signed by the Chief of Timing and reviewed and signed by the TD as his approval of the race.

All printed records from System A, System B and hand timing must be retained by the ROC for a period three (3) months after the competition or after any appeal dealing with timing or race results.

611.3.4 When the official printing timer allows manual input or correction of a time, some type of indication (star, asterix or other) concerning any effected change must be printed on all timing documentation.

611.4 **Private Timing Equipment of the Teams**
Any request to install timing equipment has to be made to the Jury by the team captain concerned, and the Jury decides concerning approval of the installation. At Olympic Winter Games, World Championships and World Cup only the organizers timing equipment is allowed.

# Timing Technical Report Form
# „How-To“ Explanation Text

## Version 3.0, June 22, 1998

The FIS Alpine Timing Technical Report Form is a required document that must be correctly completed and submitted with all race results for all alpine events in the FIS calendar beginning with the 1998-99 racing season. Events that do not submit this form, duly completed, will not be considered for FIS points.

Technical surveys conducted by the FIS since 1995, and the mountain of timing evidence collected by the Timing Working Group during this period have led to the introduction and use of this form, and to many significant changes in the FIS rules on this subject. There is without a doubt a need to have all information concerning the correct judgment of an event by the timing equipment, and techniques being used, properly indicated on the Timing Technical Report Form.

A summary of the last few year's of collected information from earlier versions of these forms used at Continental Cup events and higher requires us to make this form mandatory. Although the vast majority of FIS events are conducted correctly, the form asks questions that can only be replied to if certain minimum technical standards are met. It ensures that at least two homologated, synchronized Time-of-Day systems, plus hand timing are used, and it makes you pay attention to the details of how well the systems operate together. The Timing technical Report Form minimises errors and is designed to assist you to make the event fair for all who take part.

Please take note: For all events with two runs, it is essential that **a form be completed for each run of the competition** and that re-synchronization of the timers take place before the start of the second run.

This document represents a step-by-step explanation of what is needed in each square of the Timing technical report Form 3.0. Since some of the information being provided will most likely remain consistent (example: equipment being used, equipment serial numbers, event locations...) you can fill out most of this information once and then make photocopies if you use the same items throughout all of your competitions.

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**Event Name:**
Put the same name of the event as it is described in the FIS Calendar and on your Official Results documents. Include discipline and category details.
**Example: Nabob Cup, Men's GS**

**Location:**
Use the location as described in the FIS Calendar, or if the event has been moved, the name of the ski area you are at.
**Example: Lake Louise, AB**

**Nation:**
Use the FIS's 3 letter nation code that corresponds with the host nation.
**Example: CAN**

**Date:**
The FIS uses the dd/mm/yy format.

**Codex:**
All events in the FIS Calendar are assigned a code number so that they can be correctly identified. This race ID code number is called the „CODEX“ and there is one codex for each race that is assigned by disciple and sex. The Codex for your race is found in the FIS Calendar. It must match the Codex number used on your Official Results.
**Example: 1002**

**Run #:**
You need to complete a Timing Technical Report Form for each run of each race.

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**The following section identifies the timing equipment you use at your race.**

**Brand:**
This is the brand name of the manufacturer.
**Examples: Longines / ALGE / TAG Heuer / Seiko /**

**Model:**
This is the name of the particular device you are using.
**Examples: TL5005 / S4 / CP 505 / MT 400 /**

**Serial #:**
Each device will have a manufacturer's serial number. This is found in a variety of places on timing equipment depending on the model and manufacturer. If not found on the bottom, rear or side of the device, check inside the printer or battery compartment.

**Timing Homologation Number**
The FIS will issue a list of timing systems that have met the technical standards required for use at FIS events. **Only timing equipment on the approved list may be used at any and all alpine FIS races that appear in the FIS Calendar**. A new list will not published each season, rather The Timing Booklet will be published from time to time and additions or deletions to the list of homologated timing equipment will be contained in the precisions to the FIS rules published each fall. **Failure to use equipment on that list will cause your event not to be considered for FIS points.** Each piece of approved timing equipment will have a code number associated with it. A complete list of those codes can be found in the FIS Timing Booklet. Use the appropriate code number for the approved device you are using.
**Example: ALG.001.97**

**Timing System A:**
This is the Main Timing System

**Timing System B:**
This is the Back-Up Timing System

**Timer at Start (if Used):**
In certain circumstances, a timer at the start will be used (such as when using Time of Day wireless transmission techniques for System B). This space provides a location to describe this unit if used. This is not intended to describe the countdown Start Clock.
**Start Gate:**
Describe the start gate you used using the name of the manufacturer and the model designation.
**Photocells at Finish:**
Describe the photocells you used at the finish using the name of the manufacturer and the model designation.

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**Connections to Start**

This section deals with how your **connections to the start** were made for both the Main (System A) and Back-Up (System B) timers, and how you handled the voice communications requirements. Check or X the appropriate circle based on how you set up the two systems and the voice communication. Note that for all events you MUST have at least System A (main system) connected to the Start Gate by wire. Radio Time-of-Day data transmission is allowed for use at the FIS event level only. **Continental Cup and above must use hard wire for all systems**.

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**Time Data Section**

This is the section that provides the proof that your two systems and hand timing were synchronized and functioning as required by the rules. There are 15 pieces of information that you can only get from the timer tapes and that allow the FIS to see that you did the timing correctly. Two other times come from Hand timing data. Be prepared to gather this information from the timer tapes as it happens, or at least to know where to find it after the race. It is critical that this information be correctly retrieved and indicated on the form.

**Switch on Time:**
Every timing system needs a period of time for the quartz time base to stabilize after the timer is first switched on. This space is provided to remind you to do so in advance of the run synchronization (Recommendation: at least 30 minutes prior to synchronization).
**Indicate the Time of Day this was done.**

**Synchronization Time:**
Once System A and System B are set up and turned on, the rules require that they both be synchronized to the Time of Day no more than 30 minutes before the start of each run. Indicate the time of day the timers were preset to and synchronized at. This Time of Day must appear on the System A and System B Timing Tapes.
**Indicate the Time of Day this was done.**
**Example: 09:35:00.000**

**Start at Sync. + 1 Min.:**
Once the synchronization to the Time of Day for both systems has been accomplished, have the starter open the start wand again after 1 minute has elapsed since the synchronization. Observe the times recorded on both systems and make sure the System A and System B timers are truly running at the same time of day and are giving you very similar times from the triggering of the start. At Synchronization time plus 1 minute, the times you get on each system should be identical, or be within a few 1/1000ths (0.001 sec.). If they are not, you must re-synchronize and try again.

**Indicate the actual readings in Time of Day you take from the System A and System B tapes to the 1/1000th of a second.**
**Example: 09:36:00.123**

**Start of First Racer (Bib: )**
**Finish of First Racer**
**Start Last Racer (Bib: )**
**Finish Last Racer**

These 8 squares provide locations for the readings from the two systems of the start and finish times of your first and last racers who make it through the course. **Indicate the Time of Day Times that you record on the System A and System B tapes for these racers to the 1/1000th (0.001) of a second.** Note that there are spaces for indicating what the bib numbers of the particular racers used in your samples were.

**Net System A Time:**
These 2 positions are used to indicate the actual elapsed net times on course for the two samples of the first and last racers on course who made it to the finish, as recorded on System A. **These must be identical to the net times used on the results, and are indicated to the 1/100th (0.01) of a second.** This allows you to check if the calculation of the net times on course, as derived from the Time of Day times recorded to 1/1000ths on the System A tapes, were done correctly. Times are expressed in Min/Sec/100ths. You should also use this as an opportunity to check that the times used on the results match those calculated from the timer tapes.
**Example: 54.22**

**Net Hand Time:**
Hand Timing is mandatory for all events in the FIS Calendar. These positions allow you to provide the evidence that hand timing was used and how well it was done. The 2 hand times used here are net times on course calculated from the Time of Day start and finish times your hand timers record. Calculate the elapsed hand times on course for these two athletes and indicate them here.

**Were all times used derived from system A?:**
Indicate if all racers were timed during this run using System A as required by the FIS Rules. Check the appropriate circle, „yes“ or „no“.

**List any or all bib numbers used in the results timed on any system other than system A in this run of this race codex:**
If you answered „No“ in the section above, list the bib number(s) of the racer(s) who were timed on System B or using Hand Timing.

**Were there any timing anomalies in any of the runs during this event?**

Describe any problems or comment upon corrective actions that were necessary during the timing of this run, or any other run held during this series. Obviously if you have any racers who have times used on the results from anything other than System A, you can explain this here.

**The TD should indicate if any timing component used requires verification or service before the next event:**
This provides the opportunity to indicate if any of the equipment, wiring or other components require service or corrective actions before the next event. This can include comments even if all times were derived from System A.

**We certify that the timing and calculations of this event adhered to the prescribed FIS regulations in force.**
This is a direct statement that requires a simple „yes“ or „no“ answer.

Both the FIS Technical Delegate and the Chief of Timing must review and complete this documentation and attest to the accuracy of the information contained herein. Print and sign your names and provide the other details requested.

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**Final Notes and Suggestions:**

Quite fortunately, alpine ski racing is judged purely from the standpoint of objective criteria. Make it through the course correctly, and a skier is judged by the passage of time alone. The timing equipment list that is approved by the FIS, the rules described in section 610 of the ICR, and the use of the Timing technical Report Form ensure that many common mistakes that can jeapordise the simple truth of this timing judgment are minimised or avoided.

We are certain that your attention to detail in this regard will contribute to a successful event and we extend our thanks and best wishes for the serious work that you undertake for the benefit of ski racing worldwide.

## FIS Timing Working Group

## Federation International de Ski / Timing Technical Report Form

To be included with official results package - One Form required for each run of each Codex

| | |
|---|---|
| Event Name | Nabob Cup, Men's GS |
| Location | Lake Louise, AB |
| Nation: CAN | |
| Date | 30.03.98 |
| Codex | 1002 |
| Run # | 1 |

Form Version 3.0 / June 22 1998

| | Brand | Model | Serial Number | Timing Homologation # |
|---|---|---|---|---|
| Timing System A | ALGE | TdC4000 | 94.1023 | ALG.001.97 |
| Timing System B | LONGINES | TL5005 | 234-95 | LON.003.97 |
| Timer at Start (if used) | TAG Heuer | CP505 | 1022 | TAG.004.97 |
| Start Gate | TAG Heuer | HL7-1 | | |
| Photocells at Finish | ALGE | RLSc | | |

| Connections to Start | System A | System B | Voice Comm. |
|---|---|---|---|
| By Wire | X | X | X |
| By Radio | Not Permitted | O | X |

| | System A | System B | | |
|---|---|---|---|---|
| Switch On Time | 08:15 | 08:20 | System A, Net Time | Hand, Net Time |
| Synchonization Time | 09:35:00.000 | xxxxxxxxxxxxxxxxxxx | xxxxxxxxxxxxxxxxxxx | xxxxxxxxxxxxxxxxxxx |
| Start at Sync + 1 min. | 09:36:00.123 | 09:36:00.123 | xxxxxxxxxxxxxxxxxxx | xxxxxxxxxxxxxxxxxxx |
| Start of First Racer (Bib: 1) | 10:01:01.012 | 10:01:01.013 | xxxxxxxxxxxxxxxxxxx | xxxxxxxxxxxxxxxxxxx |
| Finish of First Racer | 10:01.55.234 | 10:01.55.239 | 54.22 | 54.36 |
| Start Last Racer (Bib: 98) | 11:15.45.986 | 11:15.45.988 | xxxxxxxxxxxxxxxxxxx | xxxxxxxxxxxxxxxxxxx |
| Finish Last Racer | 11:16:48.876 | 11:16:48.880 | 1:02.89 | 1:02.95 |

| Were all times used derived from system A? | Yes: O | No: X |
|---|---|---|

List any or all bib numbers used in the results timed on any system other than system A in this run of this race codex:
System B times were used for racers 56 and 58 due to blowing snow problems that affected the photocell for system A.
A hand time was used for racer 60 as an official inadvertently stopped in the finish line photocells as this racer crossed the finish.

Were there any timing anomalies in any of the runs during this event?

Blowing snow and lack of finish line control caused 3 timing corrections to be applied as per Art 610 if the ICR

The TD should indicate if any timing component used requires verification or service before the next event.

We certify that the timing and calculations of this event adhered to the prescribed FIS regulations in force.
YES: X NO: O

| Chief of Timing Name (Print) | Signature | Date |
|---|---|---|
| Ferd Burfell | | 30.03.98 |

| Technical Delegate Name (Print) | Signature | FIS | Date |
|---|---|---|---|
| Manfred Kattengell (GER) | | 155 | 30.03.98 |

# Federation International de Ski / Timing Technical Report Form

To be included with official results package - One Form required for each run of each Codex

| | | | |
|---|---|---|---|
| Event Name | | | |
| Location | | Nation: | |
| Date | | | |
| Codex | | | |
| Run # | | | |

Form Version 3.0 / June 22 1998

| | Brand | Model | Serial Number | Timing Homologation # |
|---|---|---|---|---|
| Timing System A | | | | |
| Timing System B | | | | |
| Timer at Start (if used) | | | | |
| Start Gate | | | | |
| Photocells at Finish | | | | |

| Connections to Start | System A | System B | Voice Comm. |
|---|---|---|---|
| By Wire | O | O | O |
| By Radio | Not Permitted | O | O |

| | System A | System B | | |
|---|---|---|---|---|
| Switch On Time | | | System A, Net Time | Hand, Net Time |
| Synchonization Time | | xxxxxxxxxxxxxxxxxxxx | xxxxxxxxxxxxxxxxxxxx | xxxxxxxxxxxxxxxxxxxx |
| Start at Sync + 1 min. | | | xxxxxxxxxxxxxxxxxxxx | xxxxxxxxxxxxxxxxxxxx |
| Start of First Racer (Bib:) | | | xxxxxxxxxxxxxxxxxxxx | xxxxxxxxxxxxxxxxxxxx |
| Finish of First Racer | | | | |
| Start Last Racer (Bib:) | | | xxxxxxxxxxxxxxxxxxxx | xxxxxxxxxxxxxxxxxxxx |
| Finish Last Racer | | | | |

| Were all times used derived from system A? | Yes: O | No: O |
|---|---|---|

List any or all bib numbers used in the results timed on any system other than system A in this run of this race codex:

Were there any timing anomalies in any of the runs during this event?

The TD should indicate if any timing component used requires verification or service before the next event.

We certify that the timing and calculations of this event adhered to the prescribed FIS regulations in force.

YES: O NO: O

| Chief of Timing Name (Print) | Signature | Date |
|---|---|---|
| | | |

| Technical Delegate Name (Print) | Signature | FIS TD # | Date |
|---|---|---|---|
| | | | |

# Criteria for FIS Approved Timing Devices for Alpine Ski Races

The following criteria must meet all timing devices that are used for Alpine FIS races and that are produced after May 1997.

| | |
|---|---|
| Timer: | The timing device must have an internal, or external printer. Printing through a computer is not allowed. |
| Printer: | This printer must print at least in a chronological order the time of day.<br><br>For each printed time of day there must be an indication of the timing channel.<br><br>If it is possible to do manipulation or correction of times in the timer the printer must mark such a corrected time. |
| Power Supply: | The timing system must work without power supply from the mains for four (4) hours at 25°C and one printout per minute and two (2) hours at –10°C and one printout per minute. |
| Operation Temperature: | The timing device and printer must work at ambient temperatures from -10° to +40°C |
| Measuring Range: | Time of day mode must be possible in hours, minutes, seconds and 1/1000, or better. |
| Timer Precision: | Must measure up to the 1/1000 second in time of day mode |
| Quartz: | Quartz accuracy must be below +/- 10 ppm at a quartz temperature from –10° to +60°C.<br><br>Aging of the quartz must be below +/- 3 ppm per year.<br><br>With adjusted quartz frequency the drift must be below +/-0.5 ppm at 25°C. |
| Impulse Triggering: | The delay of impulses is not allowed to be higher than 1/1000 sec.<br><br>The delay of impulses must be constant, the range must be less than 1/10000 sec. |
| Timing Channels: | The timing device needs a minimum of two independent channels, one for start and one for finish. |

Synchronization: Synchronization between main- and backup timer must be possible.

Electromagnetic: The timing device must meet the standards of IEC (International Electronic Commission). This means the timing device must function satisfactorily in its electromagnetic environment without introducing intolerable electromagnetic disturbances to anything in that environment.

Truncation: The truncation to 1/100 of seconds must be made after the calculation of the run time. The digits of the run time after the 1/100 are thrown away.

e.g. :

| | |
|---|---|
| Start Time: | 10:00:00.132 |
| Finish Time: | 10:01:30.259 |
| Calculated Run Time: | 1:30.127 |
| Run Time after truncation: | 1:30.12 |

Homologation: Manufacturers wishing to have their timing devices homologated for use in FIS races must supply all technical information indicated above to the „FIS Timing Working Group“ c/o Attilio Capella at the FIS Bureau in Oberhofen Switzerland.

# HOMOLOGATED BY FIS TIMING WORKING GROUP
# APPROVED BY FIS RULES COMMITTEE

Timer used as wireless data transmission for optional back-up timing must also be on this list.

| Company Name | Timer Name | Codex Timing |
|---|---|---|
| **ALGE** | TDC 4000 | ALG.001.97 |
| | TDC 8000 | ALG.002.97 |
| | COMET | ALG.003.97 |
| | S3 | ALG.004.97 |
| | S4 | ALG.005.97 |
| **Chrono CAHOUR** | Data 2000 | CAH.001.97 |
| | Data 4000 | CAH.002.97 |
| **Digitech** | Master | DIG.001.99 |
| **HEGO** | HEGO 6000 | HEG.001.97 |
| | HEGO 7000 | HEG.002.97 |
| **LONGINES** | TL2000 | LON.001.97 |
| | TL3000 | LON.002.97 |
| | TL5005 | LON.003.97 |
| **MIC** | MTS 2000 | MIC.001.97 |
| **MICROGATE** | REI | MGA.001.97 |
| | RACETIME2 | MGA.002.97 |
| **OMEGA Electr.** | OGM5005 | OME.001.97 |
| | OTR7 | OME.002.97 |
| | POWERTIME | OME.003.97 |
| | ARES 21 | OME.004.97 |
| **SEIKO** | MT-400 | SEI.001.97 |
| | CT-400 | SEI.002.97 |
| | CT-300 / CT-300II | SEI.003.97 |
| | CT-916 / CT-916II | SEI.004.97 |
| **TAG Heuer** | CP 501 | TAG.001.97 |
| | CP 502 | TAG.002.97 |
| | CP 503 | TAG.003.97 |
| | CP 505 | TAG.004.97 |
| | PTB 605 With external printer. No printing through PC | TAG.005.97 |
| | CP 705 | TAG.001.99 |
| **TELECHRON** | DIGITIME | TEL.001.97 |
| **WIMTEC** | TIME-MASTER/H | WIM.001.98 |

| System A | System B | System B by radio | Switch on to synchro | Sychro to 1st racer | Delta A-B 1st racer | Delta A-B last racer | Delta T 1st to last |
|---|---|---|---|---|---|---|---|
| ALG.005.97 | ALG.005.97 | No | 1 | 03:37 | 0.013 | 0.013 | 00:35 |
| ALG.005.97 | ALG.005.97 | No | 30 | 00:12 | 0.006 | 0.006 | 00:49 |
| ALG.005.97 | ALG.005.97 | No | 30 | 02:20 | 0.008 | 0.009 | 00:28 |
| TAG.005.97 | LON.003.97 | No | 01:29 | 19 | 0 | 0.06 | 04:30 |
| TAG.005.97 | LON.003.97 | No | 26 | 23 | 0.007 | 0.055 | 04:10 |
| TAG.005.97 | LON.003.97 | No | 48 | 27 | 0.007 | 0.048 | 03:00 |
| TAG.005.97 | LON.003.97 | No | 17 | 43 | 0.01 | 0.04 | 02:25 |
| ALG.001.97 | ALG.001.97 | | | 00:04 | 0.404 | 3.239 | 00:31 |
| ALG.001.97 | ALG.001.97 | | | 00:15 | 1.379 | 3.842 | 00:27 |
| ALG.001.97 | ALG.001.97 | | | 00:58 | 5.272 | 12.561 | 01:20 |
| ALG.001.97 | ALG.001.97 | | | 00:49 | 4.461 | 9.408 | 00:54 |
| LON.003.97 | LON.003.97 | No | 15 | 01:01 | 0.004 | 0.005 | 03:11 |
| LON.003.97 | LON.003.97 | No | 15 | 00:40 | 0.003 | 0.002 | 02:51 |
| LON.003.97 | OME.002.97 | Yes | 01:00 | 15 | 0.013 | 0.039 | 02:30 |
| LON.003.97 | OME.002.97 | Yes | 50 | 40 | 0.001 | 0.005 | 01:50 |
| LON.003.97 | OME.002.97 | Yes | 30 | 20 | 0.049 | 0.027 | 01:00 |
| LON.003.97 | OME.002.97 | Yes | 30 | 03:15 | 0.034 | 0.057 | 00:27 |
| ALG.001.97 | ALG.002.97 | No | 7 | 9 | 0 | 0 | 01:20 |
| ALG.001.97 | LON.003.97 | No | 10 | 9 | 0.001 | 0.007 | 01:03 |
| ALG.001.97 | LON.003.97 | No | 6 | 21 | 0.004 | 0.005 | 01:12 |
| ALG.001.97 | ALG.001.97 | No | 10 | 22 | 0.01 | 0.01 | 00:33 |
| ALG.001.97 | ALG.001.97 | No | | | 0.03 | 0.06 | 01:02 |
| ALG.002.97 | ALG.001.97 | No | 02:40 | 01:10 | 0 | 0 | 01:30 |
| Telecron 1210 | Telecron 1210 | No | 5 | 30 | 0 | 0.02 | 03:40 |
| ALG.001.97 | ALG.001.97 | No | 9 | 56 | 0.043 | 0.017 | 04:08 |
| Telecron 1210 | Telecron 1210 | No | 35 | 25 | 0 | 0 | 01:00 |
| ALG.001.97 | ALG.001.97 | No | 1 | 29 | 0.01 | 0.01 | 01:03 |
| Telecron 1210 | Telecron 1210 | No | 34 | 25 | 0 | 0.01 | 03:45 |
| ALG.001.97 | ALG.001.97 | No | | 30 | 0.012 | 0.031 | 01:05 |
| ALG.001.97 | ALG.001.97 | No | | 15 | 0 | 0.026 | 00:52 |
| Telecron 1210 | Digicron 224/c | No | | 47 | 0.01 | 0 | 04:15 |
| Telecron 1210 | Telecron 1210 | No | 3 | 29 | 0 | 0 | 03:20 |
| Tag H.Multi CM | Tag H.Multi CM | No | 35 | 01:00 | 0.01 | 0.025 | 01:20 |
| Tag H.Multi CM | Tag H.Multi CM | No | 02:50 | 01:30 | 0.016 | 0.023 | 00:35 |
| SEI.002.97 | SEI.003.97 | No | 5 | 01:25 | 0.01 | 0.01 | 00:40 |
| SEI.002.97 | SEI.003.97 | No | 5 | 04:10 | 0.01 | 0.01 | 00:36 |
| SEI.002.97 | SEI.003.97 | No | 5 | 02:50 | 0.01 | 0.01 | 00:30 |
| SEI.002.97 | SEI.003.97 | No | 5 | 05:25 | 0.01 | 0.01 | 00:30 |
| ALG.001.97 | Arbitar 1 | No | | 4 | 0.141 | 0.373 | 00:25 |
| ALG.001.97 | Arbitar 2 | No | 2 | 30 | 0.01 | 0.012 | 01:10 |
| LON.003.97 | LON.003.97 | No | 01:00 | 01:55 | 0.001 | 0.001 | 01:02 |
| ALG.001.97 | ALG.001.97 | | | 44 | 0.01 | 0.02 | 00:15 |
| ALG.001.97 | ALG.001.97 | No | | 16 | 0.01 | 0.01 | 00:17 |
| Alpin 1000 | Alpin 1000 | No | 5 | 01:02 | 0.057 | 0.07 | 04:26 |
| Alpin 1000 | Alpin 1000 | No | 5 | 01:14 | 0.051 | 0.076 | 00:35 |
| OME.002.97 | OME.002.97 | No | 5 | 30 | 0 | 0.09 | 01:30 |
| TAG.004.97 | TAG.004.97 | No | | 4 | 0.02 | 0.019 | 01:15 |
| MGA.001.97 | MGA.002.97 | Yes | | 13 | 0 | 0 | 02:30 |
| LON.003.97 | LON.003.97 | No | 20 | 40 | 0 | 0.001 | 01:30 |
| ALG.002.97 | ALG.002.97 | No | 45 | 30 | 0.003 | 0.008 | 01:28 |
| ALG.002.97 | ALG.001.97 | No | 15 | 01:30 | 0.03 | 0.02 | 04:50 |
| TAG.005.97 | ALG.003.97 | No | 30 | 34 | 0.001 | 0.007 | 01:17 |
| LON.003.97 | LON.003.97 | No | 1 | 01:30 | 0.002 | 0.049 | 03:55 |
| TAG.005.97 | ALG.005.97 | No | 01:00 | 30 | 0 | 0.001 | 01:15 |

# NEXT STEP

In future, we shall try to systematically homologate all pieces of timing equipment, impulse captors and transmitters according to the same principle as described in this document.

So huge a task can only be carried out over a longer period, approximately two years, as the penalisation of loyal and honest organisers with excessive regulations should be avoided.

# CONCLUSION

We hereby wish to thank all members of the "Working Group" who have always used every endeavour to realise this "FIS GUIDE" for their Technical Delegates.

We are fully aware that there are still some imperfections and would welcome any constructive proposal and as the works proceed, this document will be completed to improve the knowledge of the FIS, the referee and judge of all Alpine Skiing competitions.