Advice for Event Advisers and Controllers – How to control Emit EPT (Traditional system)

This paper is intended to equip a Controller with sufficient information to be able to check that the organiser is using the Emit system effectively.

Technical information about Emit Equipment is available at http://www.emit.no

Successful application of electronic punching is a function of the electronic punching system itself, the computer software that may be used, the reliability of the computing systems and the knowledge and skill of the team involved in handling all aspects of the electronic punching and computing systems. This typically includes entry secretaries, planners, organisers and the results computing team.

A Controller should be satisfied that all of these groups have communicated adequately and have a sufficient understanding of the systems they are using.

Principles of operation
Emit control units and control cards are both battery powered. A "punch" is registered by placing the card near to or on a control unit. In doing so, the control card transmits its code to the card and it is stored in the card memory along with the time of the punch.

Cards are downloaded onto a reader after the finish to verify the punch sequence and provide time data which may be either printed directly or passed to a computer system.

Start units and control units come pre-programmed and so are not interchangeable. They require no programming or set-up.

The Emit Controls
Standard version 2 contact controls
Controls are all pre-allocated a number between 31 and 249 (except for 66, 68, 86, 89, 98 & 99 which are not used). The number, which is shown on the bottom of the control along with the date of production, is set at manufacture and cannot change. Controls are always on. They are guaranteed for a minimum of 5 years and can last up to 10 years. When the battery in the control is reaching the end of its life it will register an additional control code (99) that will show up on competitors' ecards when they download.

Control 249 is often used as the Finish control, although any control number can be used as a finish; the software just assumes the last control punched was the finish. Joker controls are also available which can be re-programmed to any number between 31 & 249 by using a special ecard. This allows the

planner/controller, or anyone else patrolling the competition area, to just carry blank controls, which can then be changed to any number as a replacement. These also have the back-up punch in a unique position.

Controls should have the open end of the control unit facing towards the control feature, or away from the optimum approach route if on an open feature such as a depression or clearing. This allows the competitor to hold the ecard in the palm of their hand and punch with the end of the card facing back towards them.

Controls can be fixed to any type of stake, trestle, and fence pole. They have a hole at either end to allow permanent fixing. If using a pole this should ideally be aluminium, plastic or wood. If ordinary metal is used then a wood block 1 cm thick is recommended under the control, otherwise the control life span can be reduced by 10-15%.

Controls can also have a small light (LED) on them, which will flash to confirm a registration has occurred. Lights are optional for version 2 controls.

The controls have a back-up pin on them so that when an ecard is correctly placed into the control, the water resistant back-up card will receive a pin mark. The pins are in different places and can therefore be used to verify which specific controls have been visited. However, there are only a limited number of pin locations so, over the controls used for an event, some duplication is inevitable. Occasionally back-up pins can become recessed which means the pin will not mark the back-up card; such control units should be replaced.

Start Units
Start units look similar to standard control units but perform the function of clearing the memory of an emit card and starting the clock. The card clock is set to zero when the unit is placed on the start unit and starts timing as the card is lifted from the unit.

Reading unit
The 250 reading unit looks like a standard control unit except that it has no pin and it has a cable attached for connection to a computer. It is used for downloading the card data to a computer after the finish.

Mini Time Recorder Unit
Mini Time Recorder (MTR) units are small boxes, much larger than normal units. When a card is placed on top of the MTR unit, the MTR unit will read and store the card data. MTR-3 units store about 1000 cards and MTR-4 units store about 2000 cards. MTR units can be used just before the start to record who started, and the information can be downloaded to a computer. MTR units can be used at the finish to download the data into a computer, or directly to a mini-printer.

Traditional Emit Cards
There are now three types of "traditional" ecard in use:

- Version 2 cards (with no display)
- Version 3 cards (with a display)
- Version 4 cards (with no display)

Version 3 ecards have a small LCD display. The display shows three scrolling bars to indicate a successful "punch". Additional information, including control code and running time, can be viewed.
Version 4 ecards are identical to version 2 cards except that they use more modern components.

All three types of card take a water-resistant (back-up) card that will receive a pin mark from the conventional controls when an ecard is correctly placed into the control.
Placing the card squarely in the control will causes the light to flash and will also mark the back-up card.

Each card is uniquely identified, with either a 5 or 6-digit number.
Pressing the red button on a version 3 card at any time before starting a race will show the card number and then the software version.

The ecards hold up to 48 control codes and times in memory. These remain until reset by a start unit at the next event.

Ecards are guaranteed to last for 5 years and are expected to last for about 10 years. With version 3 cards nearing the end of their life, the display will dim when placed on a start unit.

The start process for traditional emit cards
Competitors place their ecard on the start unit. This clears the ecard memory and takes less than one second. On version 3 ecards, a display of zeros indicates that this process is complete. The ecard clock starts as the ecard is lifted off the start unit.

On events with pre-allocated start times where punching starts are not required, competitors need not punch on the start line. (However, they must punch a start unit before the start line in order to clear the card and start the clock). The start time is based on the allocated start, and not a start punch. In this case it is important to ensure that the computer clocks on the download system are synchronised to race time, to get accurate and consistent timing.

Punching at controls with traditional emit cards
The competitor places the ecard on the control unit to punch. The control unit has asymmetrical raised lugs to ensure correct placement of the ecard. This ensures

that a back-up punch can be registered in the correct location while the electronic punch is registered.

When punching, the Version 3 ecard briefly displays the number of the control that has been punched, then the split from the last control for a few seconds, and finally reverts to the count of controls and total run time. Where a control has had to be substituted with one with a different number, the ecard may show a control code different from the physical number displayed on the control. The physical number will show the correct control code, and competitors should always rely on the physical number displayed.

It is the competitors' responsibility to ensure the card is fully inserted into the control. It is possible for a competitor to record a punch by just touching the end of the ecard (away from the elastic) against the vertical edge of the bulge on the control unit. Some competitors seek to save time by doing this, and they can check the lights or the Version 3 display to see that the punch has been successful. If they elect not to fully insert their card, they will not get a pin prick in their back-up card and they obviously cannot dispute any subsequent electronic disqualification.

Decisions to be made in advance

Punching start or timed start. A punching start is more flexible but is not suitable for high-level events. If the start times have been input into the software, then the results programmes can use it. It is possible to use a timed start for most, but allow those who need flexibility (e.g. officials, split starters etc) to use a punching start.

Punching finish or timed finish. A punching finish is the only practical solution for large numbers of competitors.

Back-up
Ecards incorporate an intrinsic back-up capability; ensure the event provides back-up cards for competitors' ecards at Enquiries/Registration and at the Start.

The Controller should be satisfied that the team have adequate plans in place for dealing with unwanted events. In particular, no system involving electronics is totally fault-proof so, at high-level events, adequate backup measures should be in place to separately record start and finish times. Where start times are pre-allocated this may be as simple as ticking runners' names on a start list. Finish times can be secured by recording the finish with a video or web camera providing that the camera's clock has been synchronised to race time.

Mount control units on stakes or place on the ground. For major events, proper stakes should normally be used, and the numbering and kite should be consistent with IOF rules, but for events where access is difficult (e.g. high fells) it

can be acceptable to just hang a flag on a cane and put the box on the ground underneath. Boxes on the ground should be tethered and within 1 metre of the flag.

Computers

Consider whether the event requires computer-based entries and results. The ideal approach depends on the scale of the event, and smaller training events can be run without computers.

Procedures

Final Details

Where Final details are provided the following statement should be included: "It is the competitor's responsibility to check that their emit card has been correctly activated at the start and a correct punch obtained at each control including a backup pin prick on the yellow backup card. There will only be reinstatement for a missing electronic record of visiting a control if there is visible evidence of punching on the backup card."

The computer team should check the Final Details before they are published.

Checking the controls

The Planner/Forest Team MUST check that ALL controls are giving the correct electronic code before they are placed in the forest. This confirms they are working and that they have been labelled correctly in the factory. A version 3 card is the simplest way of checking control codes. It is also helpful if those placing control units punch them using a Version 3 ecard to confirm the control code.

Spare units

The planner should have a few control units available in case any are unofficially removed from the correct site. It is possible that a control cannot be replaced with the same control number as the lost control and so a different number is used. In this case, the control should be clearly labelled with the correct number. The results software can allow the alternate control code to be accepted as a correct punch.

Hour change

Emit control units are not affected by changes of daylight saving time.

The Start

Spare ecards and paper backup cards should be available at the start, especially if the start is a long way from assembly. Competitors who have a Version 3 ecard that fails to start at the check or start, for example because it has reached the end of its life of 5-10 years, may be provided with a substitute. If ecards are

substituted, a record of the exchange needs to be kept to maintain the integrity of the safety procedures.

An MTR unit can be used in the start block to record those who start. This is particularly useful for events with pre-entries. If the MTR unit has been programmed as a Start unit (an "MTR Zero"), the technique also starts the competitor's ecard. This can be used to verify correct functioning of the ecard and provide a back-up start time for competitors who fail to start their ecard properly on the start line. The ecard clock will be restarted when lifted off a start unit. Once the Start is closed, the MTR unit can be downloaded and the starters compared with the finishers as a safety check.

The MTR unit should be cleared before use if it is to be used to capture starters' details for safety reasons. At the same time, it is helpful to synchronise the MTR unit's clock to race time but this is purely a matter of convenience and will not impact on its operation if it is not carried out.

If a punching start is used, great care must be taken to ensure that all competitors punch the start unit – beginners may not realise that they have to do that.

Late starters
For a timed start, late starters must be set off according to IOF rule 22.9.
Competitors who are late for their start time shall be permitted to start. Their new start time must be recorded.
• In a mass or chasing start, the competitor shall be started as soon as possible.
• In an interval start, if the competitor is at the start line less than half the start interval after their start time they shall start immediately.
• If the competitor is at the start line more than half the start interval after their start time they shall start at the next available half start interval.
The question of whether the lateness is the organiser's fault (and therefore whether their start time can be adjusted) should be dealt with at the finish.
The competitor's actual start time must be recorded, for example by punching a "dummy" control unit, and the competitor can be left to complain to the organiser if he/she feels that the actual start time should be used.
When dealing with late starters, the official must not forget to use the MTR unit to clear and start the competitor's ecard.

The finish
The finish banner should be placed in line with the finish unit and a control flag **must** be placed on each stake to make the finish units visible to a fast-finishing runner.

In the case of a major relay, a single finish unit should be placed just beyond the finish line, and the results of close finishes (at least for the podium places) should be determined by judges. The exit from the finish line to the finish punch should

be narrow enough to ensure that finish officials can maintain the finish order from the finish line to the finish control. For close finishes, the judge's decision will be final, and so that may mean a little editing of the finish times is required to get the order right.

Competitors should be encouraged to go directly to download.

Timing
For a high-level event with a timed start, it is important that the timing for each competitor's run is based on the event clocks (i.e. the start clock and the finish computer's clock), rather than the individual clocks inside each card. Therefore, the running time for a competitor must be calculated by subtracting the competitor's known start time from the download time and then further subtracting the time from finish to download. The Emit etiming software will handle this automatically once configured for this start mode.

Note that the time from finish to download can only be based on the potentially slightly inaccurate clock inside the card. Therefore, in a high-level event where correct one-second timing must be guaranteed, it is recommended that there is only a short distance from the finish to download which will mean that any inaccuracies are insignificant. It would not be sensible to have a half-hour walk from finish to download!

Results
The exact procedure for dealing with incorrect punching will be dependent on the results software being used, if any. Typically the computer software will indicate controls missing or visited in the wrong order. At small events, where no computer is in use, the ecard will be downloaded onto an MTR box, and this will print a set of splits for the competitor. A second set must be printed and retained for the results. In this case, the splits need to be inspected to ensure that all the controls are present in the correct order. The competitor's ecard number and time is also on the print.

If using a computer at download running Emit's etiming software, there is a screen which displays a picture of the back-up card and highlights any errors. This helps to resolve disqualifications. If not using a computer then it is recommended that any disputed card is compared to any other card that has been passed as correct.

Computer software is available to provide course back-up punch patterns or you can keep the back-up card from the first correct runner on each course, provided they have a full set of back-up punches.

If a competitor has a **missing punch**, check the back-up card for evidence that the control was visited. If a pin punch has registered in the position of the "missing" control, the competitor can be credited with visiting the control. If no pin

punch is found in the position of the missing control, the competitor should be disqualified.

Note that other evidence of being at the control is not acceptable, because the competitor must **both visit the control and punch properly**. The relevant rule states:

20.5: *A competitor with a control punch missing or unidentifiable shall not be placed unless it can be established with certainty that the punch missing or unidentifiable is not the competitor's fault…..*If there is a problem with a control (misplaced or stolen) to such an extent that no acceptable result can be produced for the competition, then the course should normally be declared void. It is tempting to try to 'correct' the problem by removing the splits either side of the relevant control, but this means that competitors are not being measured over the planned course and introduces distortions such as unfairly benefiting runners who lost time on the subsequent control. IOF rule 24.15 says *The results must be based on competitors' times for the whole course. It is forbidden to eliminate sections of the course on the basis of split times unless the section has been specified in advance (e.g. a short section containing a busy road crossing).*

Identifying missing runners
For small events, results should be transferred onto the entry sheet as downloaded, to ensure that all runners have completed. For an event taking entries only on-the day and where the entries are typed into a computer system, you may be able to assume that all entrants will start and anyone not finished is still out on the course. However, for pre-entry events, or if Auto-download software is used, an MTR unit should be used in the pre-start and downloaded into the results software which may be able to identify starters who have yet to download.

Results publication
On the afternoon/evening after the event, the split times may be uploaded to:
- WinSplits and SplitsBrowser
- Route Gadget, Livelox or similar

Splits comparisons are very interesting in the few hours and days after the event, but interest declines rapidly with time.

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Recent changes: Information about Touch Free punching transferred to a separate document.

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