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EMIT MINI TIME RECORDER VERSION 2 AND THERMAL PRINTER

The Emit Mini Time Recorder version 2 (MTR2) is especially developed for use together with our Electronic Punching and Timing system (EPT) when using “electronic timing”, i.e. when the runner’s total time is to be recorded by the electronic card carried by each particicipant.

The MTR2 is programmed to communicate either with a PC or with the thermal printer MCP9810.

PRINTER OPERATION

POWER-ON
To connect the MTR2 to the printer use the short cable (approx 1 meter with male connectors in both ends) and **connect it BEFORE inserting the battery** into the MTR2. Then turn on the power of the printer, and last insert the battery into the MTR2. A long tone-scale (starting deep), will indicate that the MTR2 has recognized the correct cable, and will use the printer-protocol.

When the MTR2 is powered on, the printer will output the version of the firmware int the MTR2 and its serial number on the first line. I.e. "EMIT MTR VER 2.0 123".
If the battery has a voltage below approx. 8V, a line "BATTERY LOW" will also appear (see also section marked "BATTERIES").
The last line printed will be the date and time of the internal clock of the MTR2 in the form "YYYY-MM-DD HH:MM:SS".

NOTE: If the cable is NOT connected before the battery of the MTR2 is inserted, a shorter tone-scale will sound, the printer will not print any message, and if a ECard is read, uncomprehendable output will appear on the printer.

OPERATION
To read an ECard, place it in the "shoe" on top of the MTR2. The LED (lamp) on top of the MTR2 will light up shortly, and a high-tone will acknowlegde that the entire ECard har been read and its content stored in the MTR2. An ECard will only be read once in a row and hence only one printout will be made. In order to make more than one printout from a particular ECard read another ECard inbetween.

The attached printer will on the first line print the tag number, the "total-time" and (for "non yellow" ECards) the number of races the ECard has been used,

Example
" 12345 1:02.17 L0027"
meaning
Ecard number 12345, total time 1 hour 2 minutes and 17 seconds, and 27 races.

Total-time
The total time is the time from the ECard left a start-control (0) to the time it was placed on the last control before the MTR2 reads the ECard. If the ECard has been placed on several start-control's or placed on several MTR'2 (or 250-controls) the total time is the time from the LAST start control to the last control before the FIRST MTR2 (or 250-control). Under normal situations, the maximum number of controls that the ECard can hold is 48 controls (not counting Start(0) and MTR2(250)).

Split-times.
After the first line, all split-times are printed followed by the control's id in inverse print (white number on black background). The MTR2's code (250) is also shown, including the time from the last control to the MTR2 (this time is not included in the total-time). If an ECard has timed out (current ECard-versions have a 2 hour time-out before control 250), or a race lasts for more than 18 hours a reset/overflow of the internal clock is indicated by the symbols **?** replacing a split time.

Low-power controls.
When controls have week batteries, they insert a "99-code" just before their control number. The MTR2 does not print this 99-control number in the split times, but will at the end print "LBC#" followed by the

"control-position" that has weak battery. I.e. if the third control has weak battery, the MTR will print "LBC#03" after the split times.

THE THERMAL PRINTER (NEW IMPROVED VERSION)
The improved MCP9810-012 (MCP9810-006 old version) is a compact and light weight portable thermal printer with an RS232 serial interface via a 9-way D-type connector. It is powered from internal 4,8V Ni-Cd batteries and has maintenance free operation. Average printing speed is **10 lines** per second (versus 6) and paper width is 57 or 58mm. Operating range is 0 to +50 degrees C.

Printer Mechanism
The printer will automatically detect when the paper has run out and the low battery indicator will flash. Use the paper feed to feed through the last few centimeters of paper and fit a new roll.

After extensive printing the print temperature may rise to an unuseable level and the low battery indicator will flash and printing will be suspended until the head temperature returns to normal.

Power Supply
The mains adaptor will trickle charge the batteries when the printer is turned on or off (charge time approx. 16 hours). Low battery indicator will light to show that the battery pack is nearly exhausted. The new version of MCP9810 **has improved power supply** that will reduce battery consumption and increase operating time, especially when connected to electricity.

The MCP9810-012 should only be used in conjunction with an MPS101, MPS102 or MPS103 power adapter.

Power On Self Test
The self test procedure is initiated by turning on the printer with the paper feed button pressed.
Release the feed button and the self test procedure will start. This will check most of the printer functions.

PC-OPERATION

POWER-ON
To connect the MTR2 to the PC use the long cable and connect the MTR2 and the PC before inserting a battery into the MTR2. A short tone-scale (starting high), will indicate that the MTR2 has not detected a printer-cable, and will therefore use the PC-protocol. The protocol used is public and can be found on EMIT's WEB site (www.emit.no).

OPERATION OF MTR2 WHEN PC IS CONNECTED.
The MTR is operated in the same way as when the printer is attached. If the PC is sending commands to the MTR, requesting data or status messages, delays can eventually be noticed when reading an ECard.

ECARD-HISTORY FILE.

The MTR will store the most recent ECard's internal memory (ECard-history file). When this memory is filled, the oldest data is discarded. The number of ECards that a MTR can hold depends on the number of controls stored in each ECard. The following guide gives an indication of how many ECards a MTR2 can hold.
8 controls->3200 ECards
10 controls->2700 ECards
15 controls->2000 ECards
20 controls->1600 ECards

50 controls->700 ECards
The MTR2 also stores "pointers" to the first ECard read after a power-cycle. Some software programs might use this information to ease the dowloading of data from the previous event and not loading data from earlier events. The last 8 power-cycle pointers are kept in the MTR2. The pointer is only stored when a card is read after a power cycle. Multiple power-cycles (without any ECard reading) will not store any pointer.

BATTERIES.

MAIN-BATTERY (9V)
The MTR2 uses a 9V battery as main power supply. In order to turn **on** the MTR2 the battery has to be placed as shown on the figure placed in the battery dock (at the backside of the MTR2). In order to turn **off** the MTR2 the battery should be disconnected. When connected the battery will last from a few days to a month depending on usage and temperature. In printer-mode the MTR2 will after approx. 3 minutes go to a power-saving mode. The response from the MTR2 will be slighly slower in power-save mode as it polls approx.. 45 times per minute in power-save mode as opposed to 900 times in normal-mode. Note that when the PC-protocol is active (no printer-cable attached) the MTR2 will always be in normal-mode and hence use more power. If neither printer nor PC is connected, one can still connect the printer-cable (without the printer) to activate the power-save mode.

NON-ALCALIC BATTERIES
The MTR will work with any kind of "block battery". Some rechargeable batteries will have a nominal voltage close to or below 8V and will trigger the "BATTERY LOW" warning even when they are fully charged. One can ignore this warning and still run the MTR2 until the battery reaches approx 6V (when loaded). One should be careful when using batteries when they have less than 6V as they (under rare circomstances) might corrupt the ECard-history of the MTR.

In low temperatures (below 0 degrees Celsius) it is advicable to use Lithium batteries instead of alcalic batteries.

BACKUP-BATTERIES
The MTR2 has an internal 3V coincell battery (type CR2032). It is used to retain the memory of the MTR2 when the main battery is removed and also power the real-time clock. It should last more than 3 years, but one should not rely on it as the sole backup for ECard-data. If the clock printed then the MTR2 is powered on reads a completely wrong date this can indicate that the coincell battery should be replaced. In order to replace this battery, remove the 4 plastic/rubber feet, and remove the 4 screws to open the MTR2. The coincell sits in a socket and can be replaced without special tools/soldering. Do not use screwdriver or other metal-object when removing/inserting the coincell since this can short-circuit and damage the battery.

ENVIRONMENT
The MTR2 is waterresistant but NOT waterproof . It will work fine in temperatures down to minus 20 degrees Celcius (the thermal printer however is not designed to tolerate water or temperatures below 0 degrees).