User Manual

Emit Start Display ESD3



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EMIT START DISPLAY ESD3

The ESD3 is a modern, digital start display suitable for orienteering, cross-country skiing, biathlon, cycling, running, and other interval start sports. The display has two lines of six digits each, which can show both numbers and small/large letters. The clock time is usually displayed on the top line, while the start number and countdown of seconds to the next start are shown on the bottom line. The countdown of the last seconds before the start is marked with a clear beep signal, and the powerful LED lights on the underside of the display blink green/red. The ESD3 can be programmed with the built-in keyboard or from a PC.

The display is based on modern LED technology, with bright diodes that are clearly visible even in direct sunlight. The brightness is automatically adjusted by the built-in light sensor. In strong sunlight, the ESD3 will automatically increase the brightness, while in less intense light, the brightness is reduced to save the batteries.

The ESD3 has five built-in modes that cover most needs. It has a range of connection options for external equipment such as start gates, starting pistols, external speakers, etc. The ESD3 meets FIS requirements for homologation of start clocks and is the obvious choice for professional timekeepers.

ESD3 is delivered with the following equipment:

- Tripod stand
- Power cable 220V
- USB cable 2 m
- Raincover

ESD3 is designed to be used outdoors in "all kinds of weather," but it is not 100% waterproof. When used in rainy weather, you should protect the ESD3 by using the supplied raincover. The operating range for the ESD3 is from +40 to -20 degrees Celsius, but battery capacity is weakened when it is very cold.

Connections

ESD3 has a range of connection options for external equipment. Seen from the left, the following ports are available:



- *220V* – Connection for power cable
- *Start gates* – 7-pin XLR connector for connecting up to 6 start gates
- *Trigger in* – 3-pin XLR connector for connecting a starting pistol
- *Pulse out* – 2 banana plugs for transmitting start signal to external equipment
- *Start/Sync* – 2 banana plugs for starting and synchronizing the clock
- *Audio out* – 3-pin XLR connector for external speaker
- *RS-485* – 3-pin XLR connector for data transmission over longer distances
- *USB* – USB-B connector for connecting to a PC

Power cable and USB cable are included with the ESD3. Other cables for connecting external equipment can be ordered from Emit.

Charging the ESD3

The ESD3 has 8 rechargeable 9Ah NiMH batteries built in. The batteries are charged by connecting the included power cable to the leftmost port. When the power cable is connected, the LED labeled 'Battery' starts blinking. Let the ESD3 charge until the LED turns green. This usually takes about 3 hours if the batteries were nearly empty when charging began. The batteries will not be damaged by being connected to the power supply for extended periods.

A red light means that the battery capacity is below 30%. Orange indicates 30-60%. Yellow indicates 60-90%. Green means that the battery capacity is over 90%. When the battery capacity is below 10%, the LED starts blinking red. When fully charged, the ESD3 should have a battery capacity for about 12-85 hours of operation, depending on brightness and temperature.

LEDs

The ESD3 has six powerful LEDs located at the bottom center of the display. In interval and start list mode, these LEDs will blink red for the last five seconds before the start. At the start, they light up green for a moment. In FIS start gate mode, the LEDs blink red 5 and 4 seconds before the start. Then they blink green until 3 seconds after the start, as it is allowed to start +/- 3 seconds when using a start gate. The blinking is synchronized with the beep signal.

It is possible to modify how the LEDs blink in different modes using the menu system.

The Keyboard

The built-in keyboard is mainly used to program the ESD3.



Only the keys that have a function in the current mode can be pressed. If nothing happens when you press a key, it means the key is deactivated. Some of the number keys have multiple functions, depending on the mode.

ESD3 has the following keys:

- **0-9** - Number keys, used for entering values
- **Ready (0)** - Activates/prepares the starting pistol
- **Vol - (1)** - Lowers the volume
- **Arrow down (2)** - Navigate down
- **Starting pistol (3)** - Trigger the starting pistol
- **Arrow left (4)** - Navigate left, information menu
- **Mute (5)** - Turns the sound on/off
- **Arrow right (6)** - Navigate right, information menu
- **Vol + (7)** - Increase the volume
- **Arrow up (8)** - Navigate up
- **Wifi (9)** - Wifi menu (disabled)
- **Clear** - Removes the last character
- **Start time** - Set the start time (hh:mm:ss)
- **Set clock** - Set the clock time (hh:mm:ss)
- **Menu** - Menu for setting beep signal, LEDs, etc.
- **Interval** - Set the start interval (seconds)
- **New race** - Reset message counter
- **Mode** - Switch between different operating modes
- **Av/På** - Turns the ESD3 On/Off

When turned on, "EMIT" is first displayed, followed by "ESD3" on the top line of the display, while the bottom line shows the version number and then the battery percentage. The ESD3 starts in the previously used operating mode.

MODES

The ESD3 has five operating modes. By pressing the <Mode> key, you can switch between the different operating modes. Press the <Enter> key to select the desired operating mode.

1. **Clock only:**

The current time (hh:mm:ss) is displayed on the top line, nothing is displayed on the bottom line.

LEDs and beep signal are deactivated.

2. **Interval:**

The current time (hh:mm:ss) is displayed on the top line, the countdown of seconds is displayed on the bottom line. In this mode, the start time and start interval are used to calculate the next start. Note: The first start is the event start time plus the start interval (e.g., 10:00:00 + 15 sec = 10:00:15).

The LEDs and beep signal give a warning 10 seconds before the start and count down the last five seconds. The LEDs blink red during the countdown and blink green at the start time.

3. **Start list:**

In this mode, the ESD3 uses a start list that is uploaded either via Emit's helper program or another program. The current time (hh:mm:ss) is displayed on the top line, the start number and countdown of seconds are displayed on the bottom line. If multiple start numbers start at the same second, the ESD3 will alternate displaying the relevant start numbers.

The LEDs and beep signal give a warning 10 seconds before the start and count down the last five seconds. The LEDs blink red during the countdown and blink green at the start time.

If the start list is not uploaded, or everyone on the list has started, the ESD3 will display "LAST START" and revert to mode 1; 'Clock only'.

4. **FIS start gate:**

The start gate is connected to the ETS2 finish station, which is synchronized with the ESD3. In this mode, the ESD3 also uses a start list that is uploaded either via Emit's helper program or another program. The current time (hh:mm:ss) is displayed on the top line, the start number and countdown of seconds are displayed on the bottom line. If multiple start numbers start at the same second, the ESD3 will alternate displaying the relevant start numbers.

The LEDs and beep signal give a warning 10 seconds before the start and count down the last five seconds. The LEDs blink red 5 and 4 seconds before the start. Then they blink green until 3 seconds after the start, as it is allowed to start +/- 3 seconds when using a start gate.

If the start list is not uploaded, or everyone on the list has started, the ESD3 will display "LAST START".

5. **Start gun:**

This mode is intended for sprint cross-country skiing and other events with mass starts and multiple start gates. Up to 6 start gates are connected to the ESD3 via the input labeled 'Startgates'. A starting pistol can be connected to the input labeled 'Trigger in'. The current time (hh:mm:ss) is displayed on the top line.

By pressing the <Ready> key, the ESD3 is prepared for the start time and "ARMED" is displayed on the bottom line of the display. The start is initiated by pressing the 'Starting pistol' button or by triggering the starting pistol if it is connected.

If one of the start gates is opened before the start is initiated, the ESD3 will emit a sharp sound and display which start gate was triggered on the top line, e.g., "GATE 2". You must then press the <Ready> key again to prepare the ESD3 for a new start. If the starter wishes to recall the runners due to a false start, they must press the 'Starting pistol' button (or trigger the starting pistol again) within 7 seconds after the start. The ESD3 will then emit a sharp sound and display "WRONG START" on the display. You must then press the <Ready> key again to prepare the ESD3 for a new start.

FUNCTION KEYS

The main functions of the ESD3 are set directly by pressing one of the function keys.

Mode

Press the <Mode> key to go to the operating mode menu. The ESD3 displays the current mode on the display. Press <Mode> or the right/left arrow to go to the next operating mode. Select the desired mode with <Enter>.

Set clock

Press the <Set clock> key to set the correct time. "SETCLK" is displayed on the top line and "--:--:--" is displayed on the bottom line. Enter the correct time and finish with <Enter> when the time is exactly right. The clock can also be started with a push button connected to the 'Start/Sync' input instead of the <Enter> key.

Interval

Press the <Interval> key to enter the interval between starts in mode 2; *Interval*. The ESD3 displays "INTERV" on the top line and the number of seconds on the bottom line. Enter the desired interval (in seconds) and finish with <Enter>.

Start time

Press the <Start time> key to enter the correct start time in mode 2; Interval. "START" is displayed on the top line and the current start time is displayed on the bottom line in the format HH:MM:SS. Enter the new start time and finish with <Enter>.

Note: The first start will always be the start time plus the interval.

MENU

By pressing the <Menu> key, you can access the menus to change the beep signal, LEDs, start gate, and date. Use the up and down arrow keys to change the selected menu, and the right and left arrow keys to go to the next menu. The <Enter> key is used to confirm the desired selection.

Beep signal

Press the <Menu> key and ESD3 will display "BEEP" on the top line. The bottom line shows "10s" (10 seconds). This means that ESD3 will beep once when there are 10 seconds left to start (pre-warning), and then beep every second from 5 to start. At the start time, there will be a long beep. You can choose from the following in the beep signal menu:

- 10s: Pre-warning (10 seconds) and countdown from 5 to start.
- Count: Only countdown from 5 to start.
- Start: Only beep at the start time.

Note: It is not possible to change the beep signal in 'FIS start gate' mode.

LEDs

Press the <Menu> key and then the right arrow key to go to the LED menu. The top line shows "LED" and the bottom line shows "5s". This means that the LEDs will blink red for the last 5 seconds before the start and then blink green at the start time. The following options are available in the LED menu:

- 5s: Countdown last 5 seconds with red light, green light at start.
- 4s: Countdown last 4 seconds with red light, green light at start.
- 3s: Countdown last 3 seconds with red light, green light at start.
- 2s: Countdown last 2 seconds with red light, green light at start.
- 1s: Countdown last second with red light, green light at start.
- 0s: Only green light at start time.
- +/- 5s: Optional start, green blink from 5 seconds before start to 5 seconds after start.
- +/- 3s: Optional start, green blink from 3 seconds before start to 3 seconds after start.

Note: It is not possible to change the blinking in 'FIS start gate' mode.

Start gate

Press the <Menu> key and then the right arrow key twice to go to the start gate menu. The top line shows "GATE" and the bottom line shows "0". Start gate 0 means that ESD3 will display all start times regardless of the start gate number. If you have an event with multiple start gates, you can specify that ESD3 should only display times for the current start gate.
Press <Enter> to edit the start gate number. Press the <Clear> key to remove the 0. Then enter the desired start gate number followed by <Enter>. ESD3 will now only display start times for the current start gate.

Date
Press the <Menu> key and then the right arrow key three times to go to the date menu. The top line shows "DATE" and the bottom line shows today's date. If you want to change the date, first press the <Enter> key, then enter today's date in the format DD.MM.YY and finish with <Enter>.

New race
Press the <New race> key to reset the message counter.

Vol+/-
Press <Vol +> or <Vol -> to turn the volume up or down. The volume can be set from 0 (silent) to 10 (very loud). To increase the volume, press the <Vol +> key repeatedly. To decrease the volume, press the <Vol -> key repeatedly.

Sound/mute
Press the mute key (<5>) to turn the sound off or on. The display shows the new setting, e.g. "SOUND OFF". Press mute (<5>) again to turn the sound back on. The display will then show "SOUND ON".

External audio via the 'Audio out' output is always on, but the volume can be adjusted using <Vol +> or <Vol ->.

Information menu
Press the left or right arrow key to go to the information menu. The display shows "BATT" on the top line and the remaining battery capacity (in %) on the bottom line. Use the right arrow key to display more information. The following information is displayed:

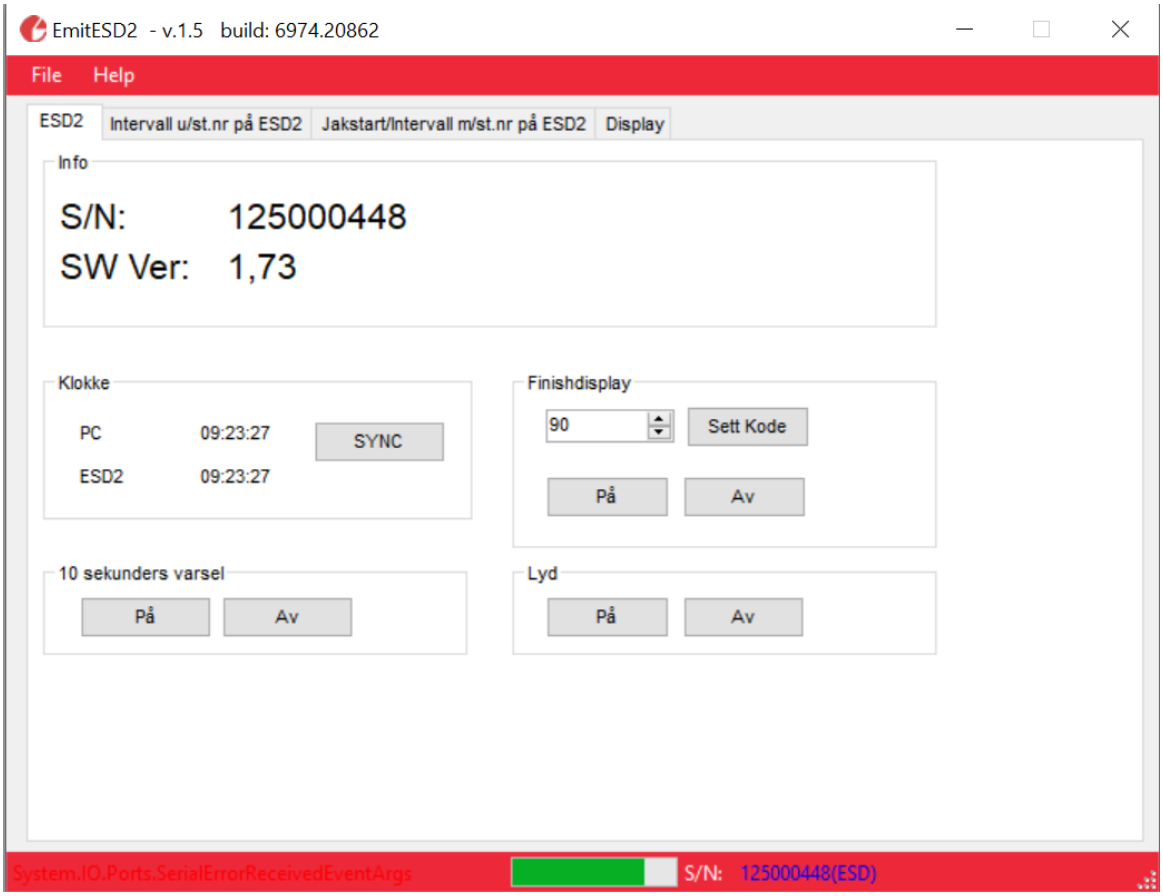
- BATT: Remaining battery capacity (in %).
- VBAT: Battery voltage in volts.
- IBAT: Current consumption in mA.
- TBAT: Battery temperature (in Celsius).
- VCHG: Power supply voltage in volts.
- TCHG: Power supply temperature (in Celsius).
- LIGHT: Displays brightness (from 1 to 10).
- PASS: Displays the number of events/messages.
- TEMP: Displays the internal temperature (in Celsius).

Press the <Clear> key to exit the information menu.

EmitESD2 - Programming ESD3 from a PC

EmitESD2 is a free program used to program ESD3 from a PC. The program can also transfer a "pursuit start file," i.e., a text file that contains all starts including start time and start number. The program can be downloaded from www.emit.no/support.

Connect ESD3 to the PC using the supplied USB cable. When the program starts, the screen below is displayed (under the 'ESD2' tab)



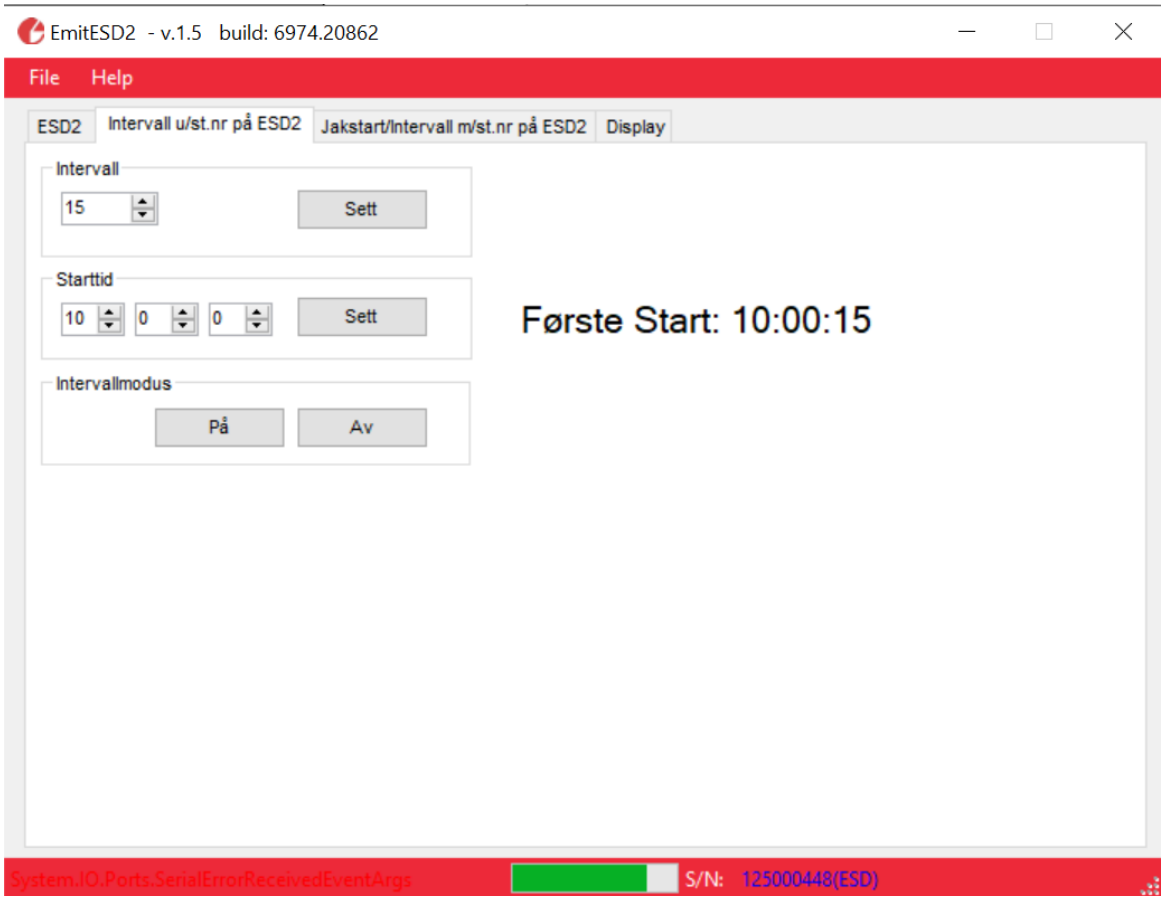
The green bar at the bottom of the screen indicates the battery voltage, while "S/N" means serial number. The serial number and firmware version are also displayed in uppercase letters at the top of the screen.

The 'Klokke' field shows the internal clock of the ESD3 as well as the PC clock. By pressing the 'SYNC' button, the ESD3 clock is set to the same time as the PC clock.

The '10-second warning' toggles a short beep 10 seconds before the start, while 'Sound' toggles a five-second countdown with four short and one long beep.

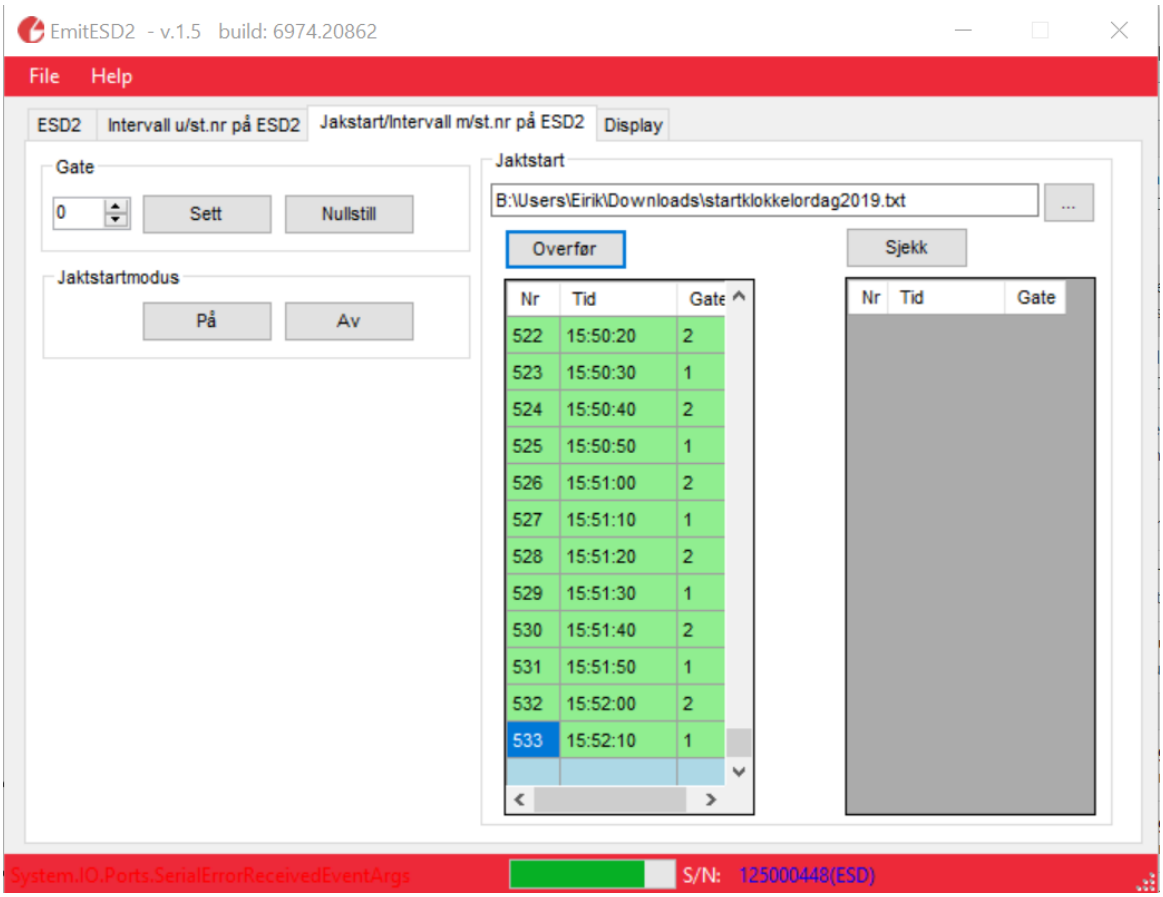
The 'Finish display' field is not used.

Programming interval with countdown, without displaying start number



Press the tab labeled "Intervall u/ st.nr. på ESD2" to display the available options. Use the "scroll bars" to select the desired values for interval and start time. Once the desired values are selected, press the 'Sett' button to transfer this to ESD3. The 'Intervallmodus' på/av (on/off) is used to set ESD3 to interval mode.

Pursuit start/interval with displaying start numbers and countdown



If you use the eTiming program, or another program with similar functionality, it is possible to export a start clock file to ESD3, with all start times sorted in order. This is a plain text file with three fields: start number, start time, and start gate number. The fields in the text file must be separated by semicolons. You can also create such a file manually from, for example, Excel. 'Gate' (start gate number) is only used for large events where there are multiple start gates. The default value is "0", which shows all starters regardless of start gate number. By setting the start gate to, for example, 1, ESD3 will only show starters with this start gate number.

Press the '...' button to the right of the 'Jaktstart' field to bring up an explorer window and find the correct text file. Transfer this to ESD3 by pressing the 'Overfør' (transfer) button. The lines are transferred one by one to ESD3 and this is indicated in green. If you want to check that all were transferred correctly, this is done by pressing the 'Sjekk' (check) button. Start ESD3 in this mode by pressing the 'Jaktstartmodus' (pursuit start mode) button. If multiple runners start at exactly the same time, ESD3 will alternate between displaying the relevant start numbers.

Problems with PC Connection

If you cannot establish contact between ESD3 and the PC, this is likely due to problems with the USB connection. Check that the cable is properly connected, and if necessary, download the latest version of the driver from: http://www.ftdichip.com/Drivers/VCP.htm.

Specification of contacts for external connections

