SOA Start Clocks
based on Keep it Simple Timing

Support

Please contact Ted Finch at kitst@finchhouse.org.

Disclaimer

The KitST clocks are designed to support the timing of sport and recreational events and are not designed to support life support or 'mission critical' systems. Information in this document is subject to change without notice. The manufacturer does not make any representations or warranties (implied or otherwise) regarding the accuracy and completeness of this document and shall in no event be liable for any loss of profit or any other commercial damage, including but not limited to special, incidental, consequential, or other damages. No part of this document may be reproduced or transmitted in any form by any means without the express written permission of the manufacturer. All brand names and product names used in this document are trademarks or registered trademarks of their respective holders.

The clock specification and software is subject to revision from time to time.

The latest version can be obtained from KitST. The upgrade entails exchanging the microprocessor chip.

©Ted Finch KitST, Keep it Simple Timing.

Introduction

The KitST Clock is designed to provide an easy to use display clock for timing sports and other activities. The bright LED display shows Hours, Minutes and Seconds in a 24 hour format.

The clock has a battery backed Accurate Real Time Clock which maintains the time when the main display clock is turned off. Once the clock has been configured then in most cases the clocks 'Turn on and Go'.

Adjustments to the clock are made by sending commands via the serial port from a PC terminal programme or the supplied configuration software.

KitST Clock Display @ 13:26:08

Turn On and Go

Slide the Off-On switch. The clock will (re)start with the saved settings and display the time based on the data obtained from the battery backed Real Time Clock.

Start Clock for Orienteering

In Orienteering Start mode the clock gives a warning beep at 50 seconds, count down beeps from 57 seconds and a long BEEP at Zero. Competitors can be reminded to 'Go on the Long Beep'.

For large events a second clock can be used as a Pre Start / Call up Clock. In pre start mode the displayed time is offset by the Pre Start delay – typically 4 minutes. If the start time is 11:15 then the pre start shows 11:19. Starters then move forward through the start boxes each minute and start at the correct time.

The Start Interval is 1 minute by default but can be adjusted to give a 30 second interval a 90 second or 2 to 6 minute interval.

**Typical Start Layout for Orienteering
or Time Trial event**

Start -1 Box	"Go on the Long Beep"	**Start Clock 11:15:10 11:15 have just started 11:16 in Start Box**
-2 Box.	(Maps on Display)	
-3 Box	(Description Sheet)	
Call up -4 Box	**Check Starters**	**Pre Start Clock 11:19:10 11:19 called into box**

Pre Start Clock for Orienteering

In Pre Start mode the clock display is offset by the Pre Start setting and gives a long BEEP at each Start interval.

Real Time / Finish Clock

The clock can be used as a Real Time Clock for example to show the time at the Finish line. In this mode the Buzzer would be OFF.

For Orienteering the Real Time display can be used as a Finish clock to enable competitors and officials to note the finish time. If required the Push Button on the rear of the clock can be used to send finish times via the serial port for processing on a computer.

As an alternative to the Push Button an optional hand held push button can be used. The hand held push button is attached to the connector on the lower right of the back of the clock. Align the pins of the connector and secure the connector by screwing up the 'lock ring'.

A short press of either button will transmit a lap or finish time.

Timer Clock

The clock can be started in Timer mode to give the time from a mass Start event or an ad hoc start time.

Hold down the Push Button (or optional Hand held Push Button) for 3 seconds when turning on the clock. The clock starts with a 00:00:00 display.

Push the button to START the timer.

Push the button to transmit Lap times to a computer via the serial port.

Hold the button down to STOP the timer.

Push the button to RESET to Zero.

(Short and Long Beeps give feedback when using the push button)

Start Beeps in Timer mode. Set the clock display to 00:00:00 as above. Then hold the button down for a Long press. The clock will give normal Count Down Beeps every minute. To turn Beeps off repeat the process.

Configuring the Clock

The clock can be configured using the supplied KitST Configure software or a standard 'Terminal' application such as HyperTerminal. The software permits settings to be adjusted and then to be sent to the clock via the serial communication port. The time and other settings are retained in battery backed memory and are retrieved when the clock is turned on.

Connect a USB cable from the clock to the USB port on the computer, wait for the USB connection to be recognised. Turn on the Clock. Start the KitST Configuration application. Connect the software to the appropriate Com Port. {On completion close the connection, close the KitST Configuration program and then disconnect the cable.}
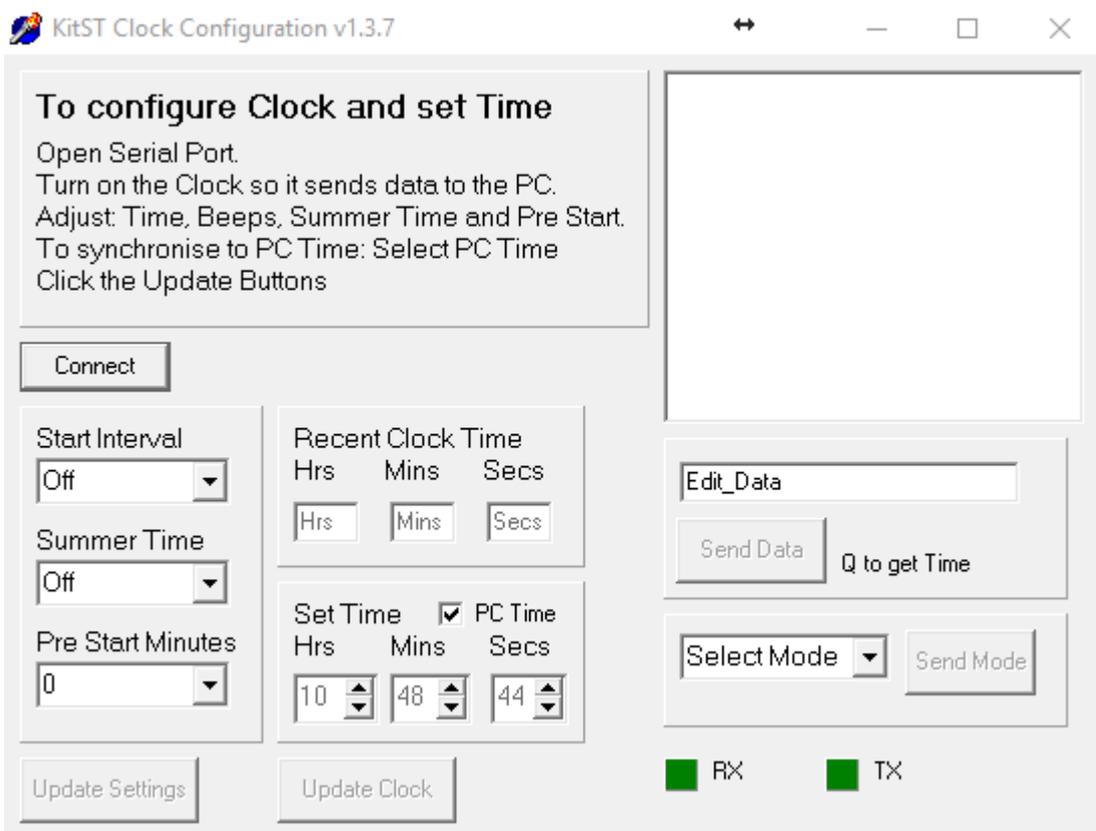
Initial Screen - note buttons are not active as no connection has been made.

Press Connect and then select a COM port and press OK
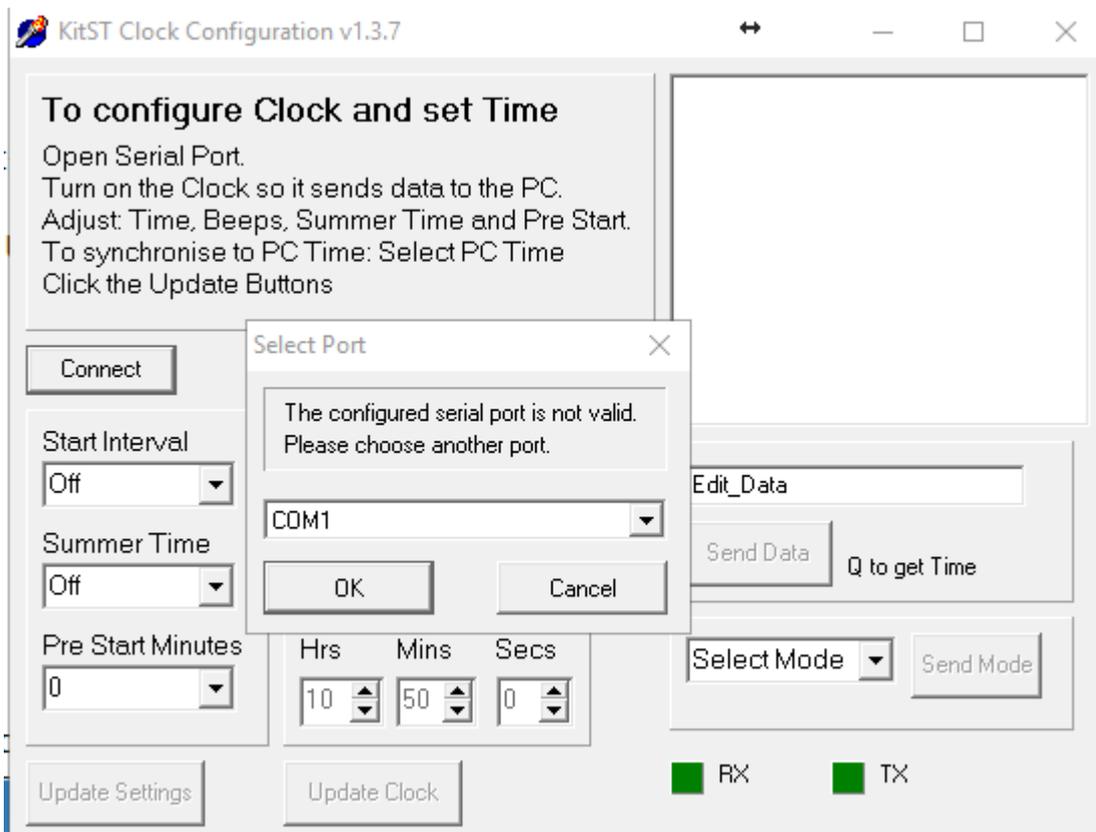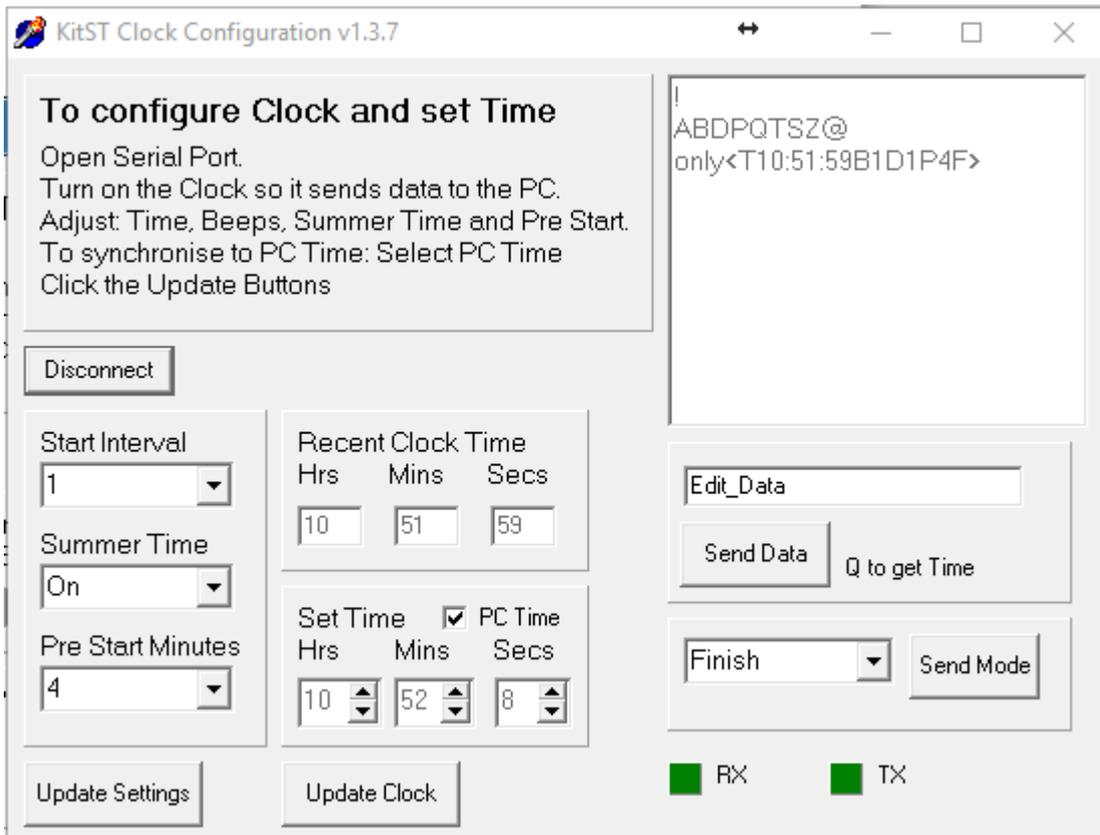
The top right box shows the data received from the clock once the connection is established.

<u>To synchronise the clock to PC time.</u>

Note Windows does not update the PC time very often so it is a good plan to force a time synchronisation. The location can be hard to find especially in Windows 10.

Type 'set the time and date' into the Windows search box and then click on the link called **set the time and date** that appears at the top of the search results list.

Select the TAB **Internet Time** and then the Button **Change Settings** then the button **Update Now**.

Now to synchronise the KitST clock to PC time use the KitST Configuration software. Select **PC Time** then Press **Update Clock**.

<u>To adjust settings</u>

Select Start Interval Off, 1, 2 etc., Select Summer Time On or Off and the Pre Start Minutes offset as required and Press **Update Settings**.

<u>To adjust the Mode of the Clock</u>

To set the clock mode as a Start, Pre Start or Finish clock select the Mode and Press **Send Mode**.

☐ In Start mode the clock sounds the countdown beeps.

☐ In Pre Start mode the clock only sounds a beep each start interval.

☐ In Finish Mode there are no beeps.

To manually synchronise the clock to another time source: De select the PC Time option and adjust the Hours, Minutes and Seconds using the scroll arrows and press **Update Time** when the reference clock changes.

To just synchronise the seconds to Zero to synchronise the clock enter **Z** into the Send Data box and press **Send Data** when the reference clock changes. Note that clock minute will advance if the seconds had already reached 30 seconds.

A full list of all the message formats is given in a later section.

On completion close the connection, close the KitST Configuration and then disconnect the cable.}

*SLOW the clock. ***

The time display can be delayed using a temporary Time Zone.

To delay the clock use the push button:

    Long Press to enter adjust mode – minute dot flashes.
    Short Press to delay by a minute. Repeat as required.
    Long Press to move to hour – hour dot flashes.
    Short press to delay by an hour. Repeat as required
    Long Press to complete.

Further adjustments can be made as required.

To reset Time Zone - turn off then turn on again.

Charging the battery

The main battery is a re-chargeable NiMH battery. Note that NiMH batteries do slowly lose their charge when stored for long periods so the clock should be re charged shortly before use. NiMH batteries can be 'topped up' and do not suffer the memory effect of NiCad batteries.

The charger comprises a transformer which is plugged into the mains and a small charging unit. The output from the charging unit should be connected to the charge socket on the clock and the power switch pushed to the OFF position. Connect the plug in the correct orientation – do not force the plug in. Secure the connection with the threaded bush.

Typically the light on the charger shows RED whilst charging and GREEN when charging is complete.

When the battery runs down the main display will dim leaving only the dots illuminated. The battery backed real time clock will retain the time when the main display is turned off. The back-up battery has an estimated life of 3 years before replacement is required. If the Real Time Clock time 'drifts' significantly then it is time to replace the back-up battery. Contact KitST for instructions.

Installing Software

Configuration Software

The software can also be downloaded from:
http://finchhouse.org/owncloud/index.php/s/ie0ygjIrI8KtuGa

A more sophisticated Windows installer is also available.
http://finchhouse.org/owncloud/index.php/s/krZ48loLQrNr4Hx
Unzip the zip file and then run the installer kitst_setup.msi

Installing the USB adaptor

The Clock has a built in USB adaptor.

Windows will normally detect the adaptor and install the drivers for the device.

The FTDI drivers are available here if required.
http://finchhouse.org/owncloud/index.php/s/NOTaa6ikk6S1buy

To use the configuration software you need to verify which COM port has been allocated to the adaptor. To verify that the adaptor has been installed correctly and to locate the COM port assignment:

☐   Click **Start - Control Panel - System**.

☐   Inside **System Properties**, click on **Hardware** - **Device Manager**.

☐   Double-click on Ports (COM & LPT1). You should see the USB Serial adaptor device listed. Note the COM port e.g. COM3, for use with the KitST configuration software.

☐   You can allocate an alternative COM port by double-clicking on the device name to show **Properties**, select **Port Settings** then **Advanced**. In Advanced settings select **COM Port Number** and choose an unallocated number. If possible choose COM1, COM2, COM3 or COM4.
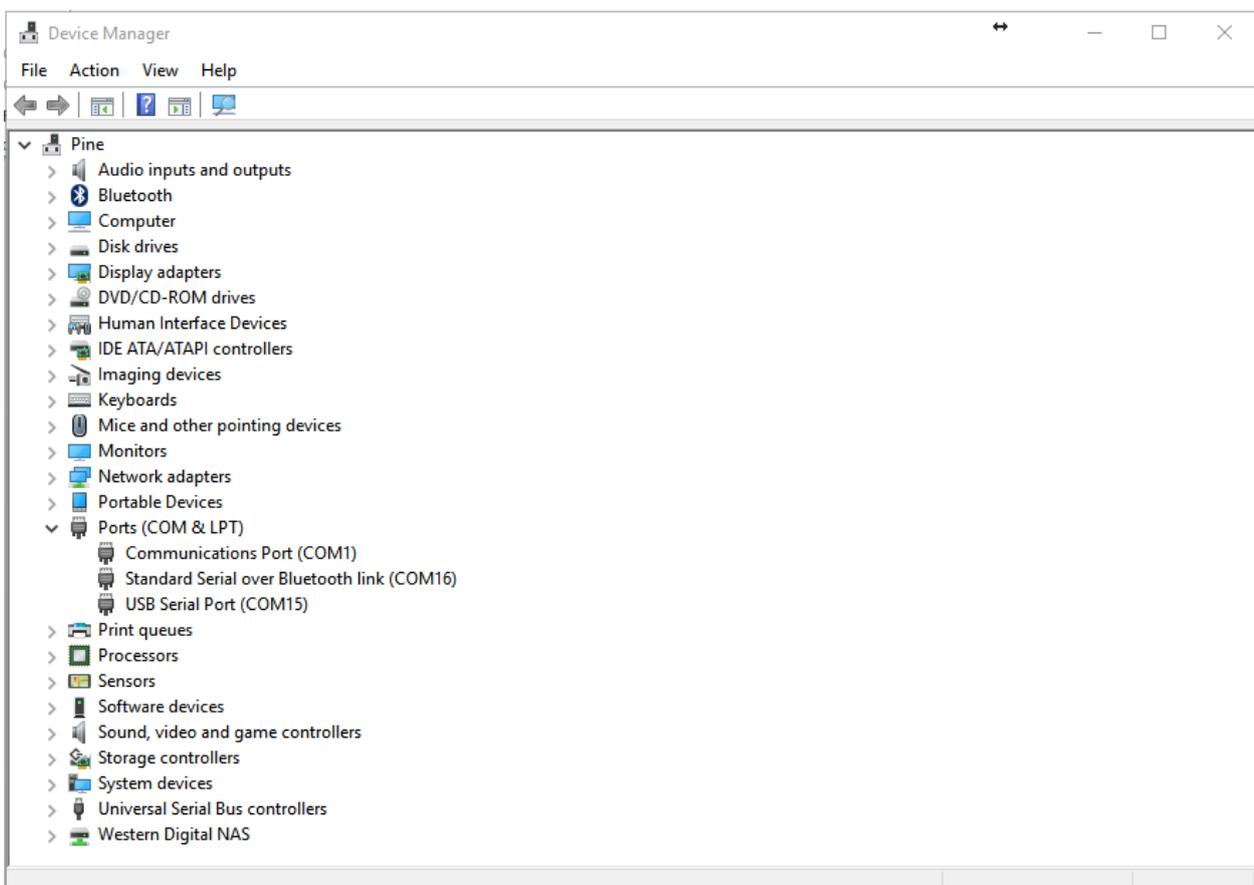
USB Serial Port Com15 installed when the clock is connected.

Serial Communication Messages

Any suitable terminal programme can be used to transmit data to the clock over a serial port as an alternative to the configuration software supplied. The clock transmits a Menu and will accept and respond to the following commands. The protocol is 9600 baud, 8 bit No parity.

Beep **B0**   Buzzer OFF
      B1   Buzzer every 1 Minute
      B2   Buzzer every 2 Minutes   ….
      B6   Buzzer every 6 Minutes
      B8   Buzzer every 90 seconds
      B9   Buzzer every 30 Seconds

Daylight Saving Time (Summer Time)
      D0   DST OFF
      D1   DST ON

Pre Start Delay (This setting is only used when a clock is in Pre Start Mode)
      P0   No Pre Start Offset
      P1   1 Minute Offset   …
      P9   9 Minute Offset

Quit   Quits the Menu and enables transmission of the time each second. Normally only used for test purposes. Send again to quit the transmission of times and returns to the Menu.
      Q

Zero   Zero seconds to synchronise the clock. If seconds are 30 or more then the clock moves forward to the next minute.
      Z

Time   Time can be set by sending T followed by the Hours, Minutes and Seconds. The figures should be in 24 hour format with leading zeroes. e.g. T130745
      Thhmmss

Mode   The Clock Mode can be set by sending @ followed by F, P or S
      @F   Finish Mode: No Beeps. Use this mode for a Real Time Clock.
      @P   Pre Start Mode: Warning **BEEP** each start, offset by the Pre Start delay.
      @S   Start Mode: Count down beeps and **BEEP** each start.

The time and other settings are retained in battery backed memory and are retrieved when the clock is turned on.

Finisher or Lap Times

The data transmitted when the push button is pressed consists of a sequence number and the time of the button press. The two datum are separated by a TAB character. (0x09) and the record is terminated with a CR LF pair (0x13 0x10)

              nnnnn   **0x09 hhmmss**   **0x13 0x10**

When the Timer is stopped with a long button press the stop time is transmitted.

              STOP   **0x09 hhmmss**   **0x13 0x10**

The received data may be used by suitable software to create race results.