

How to run the timing system

This is a step by step guide to how to set up, operate and get the information from the Timing System. Analysing the results will come later.

Index

1	The equipment	2
1.1	Laptop.....	2
1.2	Aerial	2
1.3	Flight Case	2
1.4	Master Tag	2
1.4.1	Test Function	2
1.4.2	Control Function.....	2
2	When you get the system back home after the event	3
2.1	Charge the batteries	3
2.1.1	The aerial battery	3
2.1.2	The reader battery	3
3	A couple of days before the event.	3
3.1	Charge the batteries	3
3.2	Check everything is in the case.....	3
4	At the event.....	3
4.1	Setting up the hardware	3
4.1.1	Find the cables.....	3
4.1.2	Attach the serial cable to reader.....	3
4.1.3	Attach the serial cable to adaptor	3
4.1.4	Attach the reader power cable to battery and reader.....	3
4.1.5	Plug the USB end of the adaptor into the computer	3
4.1.6	Attach the aerial link cable between the reader and the tag aerial.....	3
4.2	Setting up the computer	3
4.2.1	Turn on the computer	3
4.2.2	Turn on the Reader	4
4.2.3	Check which COM port the computer has allocated to the tag reader	4
4.3	Setting up the Tag Controller	4
4.4	Waking up the tags	4
4.5	Setting up the Aerial.....	6
4.5.1	Placement.....	6
4.5.2	Set up	6
4.5.3	Switch on	6
4.5.4	Finishing up	6
5	Race Procedure	7
5.1	Tag mounting.....	7
5.2	Tag checking	7
5.3	Master Tag	7
5.4	Time Trial.....	7
5.5	Races	7
6	Data Download.....	8
6.1	Set up Tag Controller Software	8
6.2	Download Data	8
6.3	Save data	9
6.4	Put tags to sleep	9

1 THE EQUIPMENT

This is in three main bits

1.1 Laptop

Pretty self explanatory but there are some extra bits. There should be:-

Laptop

Mains power supply

Car cigarette lighter power supply

Car cigarette power supply splitter

Mouse

Keypad

1.2 Aerial

This is all together on an old extension cable reel. The battery is mounted in the plastic box attached to the frame and the transmitter is in the aluminium box that is attached where the sockets used to be. There is a power lead threaded through the frame that is used to join the battery to the transmitter.

1.3 Flight Case

This has all the rest of the bits and pieces and will almost certainly have gained some more. When opening the case, make sure that the side with the rubber feet on is UP, other wise all the assorted stuff will fall out when you open the case! This will be tidied up when the reader is shrunk but this hasn't happened yet!

Inside the case you will find:-

Tags – neatly mounted in one side. There aren't a complete set so there will be some gaps but try and keep them in numerical order as it makes life easier.

Reader – large white thing with an LCD display. This is what does all the tag control things. The display and the buttons underneath are not fully functional so leave well alone.

USB-Serial adaptor – allows the laptop to talk to the reader.

Serial Cable - a cable that joins the USB-Serial adaptor to the reader.

Reader battery – a sealed lead acid battery.

Reader power lead – this has 2 push on connectors on one end and a barrel plug on the other

Aerial link cable – this joins the reader to the tag aerial and has BNC connectors (a bit like TV aerial connectors) at each end.

Battery charger – 'wall-wart' with 2 push on connectors and a barrel connector. This has a red LED that is on continuously when the battery is charging and flashes when it is charged,

Lighter socket power lead & extension lead – allow the reader to be powered from the car.

1.4 Master Tag

This is a special tag with 2 specific functions, as a tester to check the aerial is working and a control tag to mark the start and finish points of races.

1.4.1 Test Function

The LED on the Master Tag indicates the tag has received a signal as do the ordinary tags but unlike the ordinary tags the LED stays on. The signal also doesn't activate the lap counter. This allows the Master Tag to be moved over the track aerial to check it is working and the limit of its range. It can be left in the field of the aerial to give an indication that the aerial is working.

1.4.2 Control Function

Although the Master Tag doesn't record times via the aerial, it does do it by way of the button located on one face. Operating this button records a lap time and also lights the LED as well. As part of the race timing, the Master Tag would be operated once at the start of the race and once just before the leader crosses the line to finish. This gives 2 definite reference points to aid the analysis of the tag data.

2 WHEN YOU GET THE SYSTEM BACK HOME AFTER THE EVENT

2.1 Charge the batteries

There are 2 batteries that need to be charged; one for the aerial which is in a box mounted on the aerial cable reel and one for the reader which is in the tag case. The battery charger lives in the flight case and has a red LED that is on continuously when the battery is charging and flashes when it is charged,

The batteries can take a few hours to charge so allow enough time.

2.1.1 The aerial battery

To charge the aerial battery, plug in the plug on the charger lead into the socket on the battery box.

2.1.2 The reader battery

To charge the reader battery, attach the push on connectors to the terminals on the battery. Make sure that the connectors are the right way round! Red to positive and black to negative.

3 A COUPLE OF DAYS BEFORE THE EVENT.

3.1 Charge the batteries

If you followed step 2.1 then they should still be charged but it is worth a check, if they are full the charger LED will switch onto the charged flashing mode in a few seconds

3.2 Check everything is in the case

The case should have everything listed in section 1.3

4 AT THE EVENT

The setup

4.1 Setting up the hardware

Open up the flight case, with the feet up to stop stuff falling out.

4.1.1 Find the cables

Reader power lead, the aerial link cable, the serial cable and the usb-serial adaptor.

4.1.2 Attach the serial cable to reader

The serial socket on the reader is inside the case, through the opening on the right. Take care not to push the socket too hard as it is only soldered to the circuit board and is fairly easy to damage. Screw in the cable to avoid accidental falling out.

4.1.3 Attach the serial cable to adaptor

Screw in the cable to avoid accidental falling out.

4.1.4 Attach the reader power cable to battery and reader

Make sure you have the correct cable terminals connected to the battery terminals.

4.1.5 Plug the USB end of the adaptor into the computer

Surely you don't need a description for this?

4.1.6 Attach the aerial link cable between the reader and the tag aerial

4.2 Setting up the computer

This looks rather long winded but actually doesn't take very long.

4.2.1 Turn on the computer

How you do this is up to you but I find the button at the back right of the keyboard works better than chocolate, flowers, compliments, perfume or excessive quantities of alcohol. Up to you really.

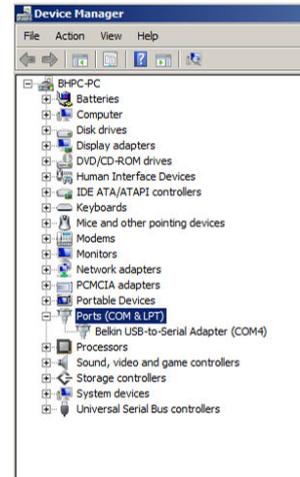
4.2.2 Turn on the Reader

Switch next to the power socket. It will make an electronic noise and the LCD screen will switch on.
If you don't the computer won't detect it.

4.2.3 Check which COM port the computer has allocated to the tag reader

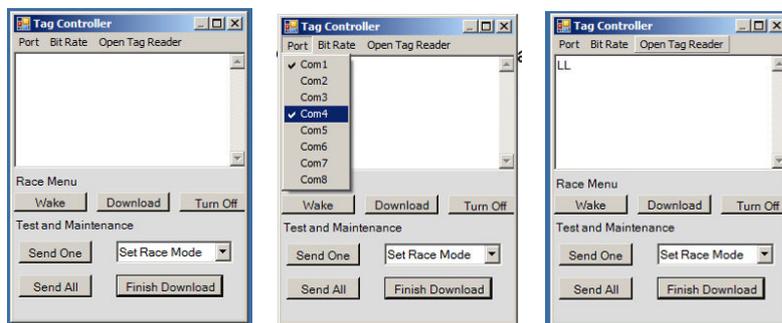
To do this first double click on the Star icon on the desktop, this will open up the Device Manager. Then go down to Ports (COM & LPT) and expand it.

On this list there will be something listed called Belkin USB-to-Serial Adaptor and will give a COM port number, such as the COM4 shown here. Remember this, you will need it.



4.3 Setting up the Tag Controller

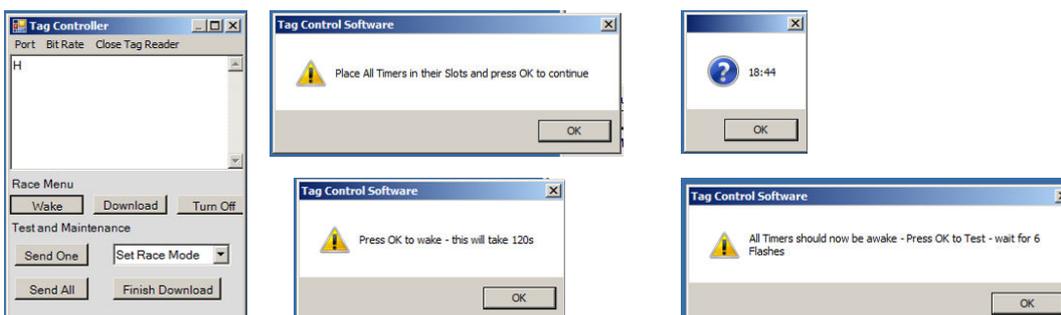
Double click on the Icon under the Device Manager star, imaginatively named Tagcontroller.exe and this will start the controller program.



Select Port from the top menu and click on the Com port assigned to the Tag reader that was found above. Then click on Open Tag Reader.
The software is now alive...

4.4 Waking up the tags

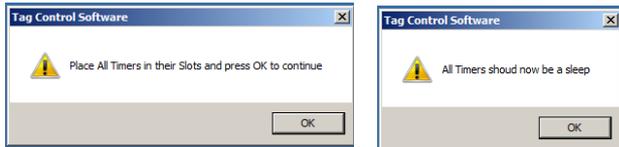
In the Tag Controller window click on the Wake button, this will generate a message to 'Place All Timers in their Slots and press OK to continue' press OK the wake-up sequence will begin. The tags will start to flash individually in a random way for 2 minutes, after which they will all flash together. A window will pop up with the time on the computer when they all flash, ignore this at the moment.



A window will now pop up which asks you to Press OK for Test. When the tags are flashing, check to see if any aren't flashing, they may not have woken up.

To ensure that the tags are properly synchronised (they can be woken up by electrical pulses such as switching on fluorescent lights) we will now put them all to sleep and then wake them up again.

In the Tag Controller window press the Turn Off button, this will put all the tags to sleep.



To check whether the tags are asleep, you can do a control LED flash by selecting Test Pulse from the drop down menu and then pressing the Send One button if they aren't they will flash.

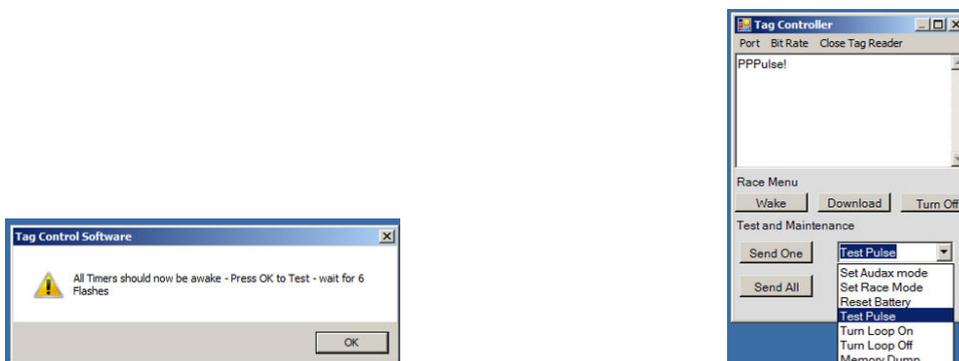
Now we need to wake the tags up again, so in the Tag Controller window click on the Wake button, this will generate a message to 'Place All Timers in their Slots and press OK to continue' press OK the wake-up sequence will begin.

The tags will start to flash individually in a random way for 2 minutes, after which they will all flash together.

A window will pop up with the time on the computer when they all flash, make a note of the time displayed, this is the reset time and will help to sort the data afterwards.



A window will now pop up which asks you to Press OK for Test.



When the tags are doing their test flashes, check to see if there are any that aren't responding. If you aren't sure, don't panic, you can do a control LED flash by selecting Test Pulse from the drop down menu and then pressing the Send One button. If any aren't responding take them out of the box or mark them so they don't get used.

Once you are happy that the tags are awake, disconnect the Aerial link cable and you can pass the tags over to registration for handing them out.

People should be instructed to check that their tag is working on the bike by wheeling them over the aerial and checking that the LED lights up, it allows about 15 seconds before lighting up again to avoid lots of laps being recorded so some care has to be taken when checking.

4.5 Setting up the Aerial

4.5.1 Placement

The aerial loop should be on the finish line. Where possible set the start line at least 3 metres back from the aerial, this allows the aerial to remain on when people are assembling on the start line without their tags continually registering laps. The tags don't allow a second reading within 10-15 seconds but that can still result in a lot of spurious data if someone is on the line for 5 minutes!

4.5.2 Set up

First off, make sure the power cable is disconnected from the battery and the transmitter. Unwind the aerial wire across the track, it is best to unwind it completely and leave some loose at either side. Best to make sure the reel is a safe distance back from the track in case anyone runs wide.

Set the wires across the track about a yard apart and tape down. This might be difficult if the track is wet...

4.5.3 Switch on

Slightly obvious this but...

Using the lead that is under the battery, connect the battery to the transmitter. This lead will only work one way round, the end with some blue tape on is the transmitter end.

The switch is on the other end of the transmitter box along with an LED that should indicate that the power is on – this is very difficult to see in bright sunlight.

Swing the Master Tag above the aerial to check that it is working – the LED on the Master Tag will light up when it is in the field.

4.5.4 Finishing up

Once racing has finished, switch off the transmitter and disconnect the power lead at both ends.

Un-tape the cable from the track, taking care to leave as little tape and glue as possible on the cable. Wind the cable back onto the reel.

Make sure that the power lead remains disconnected, if it is plugged back in the battery can become completely discharged which means we have to buy a new one.

5 RACE PROCEDURE

This is shown for a single race but is the same for however many heats are required.

5.1 Tag mounting

The tags should be mounted as low as possible in the orientations shown by the sticker on the box. Put them inside a plastic bag if they are going to be gaffa-taped on to avoid the case and reader getting gunged up with glue.

The tags should be mounted below any metal as it masks the signal from the aerial.

5.2 Tag checking

The LED on the tag will flash when it passes through the field above the aerial indicating that a lap has been recorded. It will then not read a lap for about 15 seconds to avoid multiple laps being recorded in a very short space of time. This LED flash will indicate that the tag is working in its mounted position. Not necessary for a position that has been used before but still worth checking.

5.3 Master Tag

This is a very useful tool for working out the results so take care with it. As a backup try to make a note of the times (according to the laptop clock) that the races start and finish as this gives a second line of defence in decoding the data if the Master Tag doesn't work for some reason.

5.4 Time Trial

At the start of the time trial, i.e. before anyone has started, press the master tag button and if possible make a note of the time. Once the last rider has finished, press the master tag button again and again make a note of the time.

5.5 Races

At start of the race, the Master Tag should be operated once to give a definite start time and if possible the time according to the laptop should be recorded.

At the end of the race, just before the leader crosses the line, the Master Tag should be operated once to record the finish time and again if possible the time should be recorded.

This is repeated for each heat, for those events that have several heats.

6 DATA DOWNLOAD

Back to the laptop...

This can be done for each race or all-together at the end of the day.

The tags go to sleep after a few hours without registering a lap so if there is likely to be a long interval between races, it is probably best to do several download sessions as while it is usually possible to recover data from a tag that has gone to sleep, it is much more difficult and time consuming.

6.1 Set up Tag Controller Software

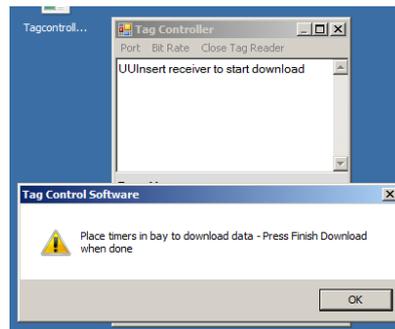
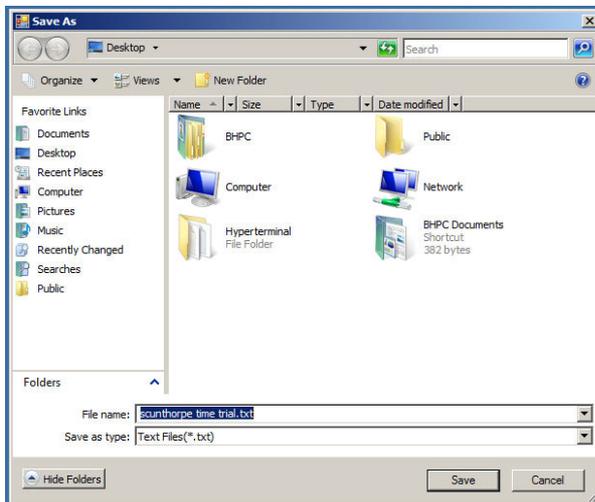
This is only necessary if you have switched the program off from setting up.

To set up a connection see Setting up the Tag Controller 4.3

6.2 Download Data

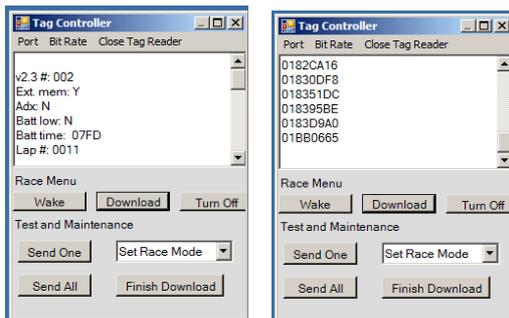
Make sure the aerial link cable is disconnected – leaving it on can cause problems.

Press the Download button on the Tag Controller, this will bring up a new window that prompts for the name and location of the file that the data will be written to. If you are doing more than one download per event, try to give them a name that will be easy for someone else to distinguish them by!



When you hit Save, a window will pop up telling you to put the timers in the bay, this is labelled TAG DOCK on the reader. Try to get the tag in square and push it in pretty quickly as if it is still moving when the download starts then it can corrupt the data.

The download will only take a couple of seconds and you will (possibly) notice a change of text in the Tag Controller window. In the first picture below, it just shows the tag header, in this case the 002 on the first line means that it is tag 2 and the Lap #: 0011 would appear to mean that there are 11 laps. Unfortunately this is a bit misleading as that number is in hexadecimal which means that there were in fact 17 laps



If you move the slider down to the bottom of the data as shown in the second picture you can see the last numbers. If you don't get a complete 8 figure code or one longer than 8 figures at the end then it means that the tag hasn't completely downloaded. Take it out and try again. If the data is being downloaded part way through an event, hand the tag back to the rider, otherwise put it back into the case.

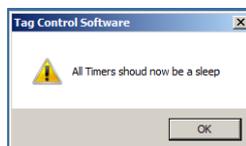
6.3 Save data

Once you have downloaded the data from all the tags, press the Finish Download button, this will save the data into the text file previously named and a popup window will tell you that reading is finished. This is now ready to be imported into the analysis program.



6.4 Put tags to sleep

Once racing has finished for the day, collect all the tags back and put them into the slots in the flight case. The position isn't critical but it makes life easier if they are in numerical order. Connect the aerial link cable to the reader and tag case. In the Tag Controller window press the Turn Off button, this will put all the tags to sleep.



To check whether the tags are asleep, you can do a control LED flash by selecting Test Pulse from the drop down menu and then pressing the Send One button if they aren't they will flash.

Time to go and do the race analysis, but that is another story....