TimeMachine Manual

1 — Last update: 2017/06/22

Trident RFID Pty Ltd

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Getting Started

Thank you for purchasing a Trident Timing System and welcome to our online help manual.

> ✳ The functionality and behaviour of your TM Reader is dependent of the version of Firmware installed on your TM Reader. It is recommended that your firmware is always the most current version. This can be downloaded from the TimeMachine Firmware Update Section.

If you need to search for a specific topic, simply use the search function on the top of the screen. Input either a word or if you require a specific set of words place the set of words between double quotes, and the search will give topics where those words appear together and in that order.

This Manual covers all versions of the Trident TimeMachine including the Club-LTE, Club-XR and Pro-XWR.

Please note that these capabilities, functions and operations can be affected by the environment in which you are using your TimeMachine. It is recommended that you fully read this manual in order to obtain optimal system performance.

> ❗ There are advanced settings that can be changed in your unit. Some of these settings will cause your reader to operate incorrectly if you change them without consulting this manual. Please read all information in this manual prior to changing network settings or your config.ini

By now you should have some compatible software to manage and score any events you time with your Trident Time Machine. If you do not, please contact your Trident Sales Person whom will be able to help you with your selection.

Please read this carefully and familiarise yourself with your new reader. One hour spent learning about your new system now will save you many hours later!!

Trident provides an easy test program called TinyScore that you can use to test your gear and run a race using a mat start and mat finish.

Contents of Equipment

> **!** Please check you have unpacked all items listed below before discarding any packaging.

The following items are included with your TimeMachine System dependent on which package you purchased.
(Click on the links for images and quantities).

Trident TM Club-LTE Bundle: Club-LTE Reader, 2 × 3M Ultra ProMat or 1 × 6M Ultra ProMat, Micro USB Cable, External Beeper, Mains Power/Charger, Ethernet Cable

Trident TM Club-XR Bundle: Club-XR Reader, 2 × 3M Ultra ProMat or 1 × 6M Ultra ProMat, Micro USB Cable, External Beeper, Mains Power/Charger, Ethernet Cable, USB Master Modem, Antenna Extension

Trident TM Active-XWR Bundle: Active-XWR Reader, 2 x Active Loop Antennas, Micro USB Cable, External Beeper, Mains Power/Charger, Ethernet Cable, USB Master Modem, Antenna Extension

Trident TM Pro-XWR Bundle: Pro-XWR Reader, 4 × 3M Ultra ProMat or 2 × 6M Ultra ProMat, Micro USB Cable, External Beeper, Mains Power/Charger, Ethernet Cable, USB Master Modem, Antenna Extension

The XWR describes the Enhanced Communications. The letters stand for:

- **X** = eXtended router functions including WiFi & DHCP (dynamic host configuration protocol)
- **W** = Web enabled with integrated 3G Comms and SIM card for web connectivity

- **R** = Radio Modem communications

Verify that you have all the required components for the product you have purchased. If you are missing any of these components contact your distributor.

Items not included

• Computer (laptop recommended) running Microsoft Windows. Your computer needs: one available USB port, one available Ethernet port.

• Timing Software

A Quick Look at your TM V2 Reader

Below is a quick explanation on the front panel layout of your TM V2 Reader. Detailed explanations can be found by clicking on the appropriate label in the text below the picture.

1 – Battery Voltage Indicator	2 – Power Button
3 – Auxiliary 12V Output	4 – Radio Antenna Connector
5 – External Power Socket	6 – Receive Loop Sockets
7 – Transmit Loop Sockets	8 – External Trigger Socket

9 – External Buzzer Socket	10 – RS232 Data Port
"11 – 3G Antenna Connection	"12 – TX Power Switch Low, Medium, High
13 – Reset Connector	14 – Relay Connector
15 – Clock Connector	16 – Inhibit Connector
17 – Inhibit Plug	"18 – SIM Card
19 – Router Indicators	20 – 3G Modem USB Socket
21 – Transmit Tune Button	22 – Radio Indicators
23 – SD Card	24 – Micro USB Socket
25 – Data Mode Switch	26 – Data USB Socket
27 – Receiver Status Indicators	28 – Tag Read Activity Indicators
29 – Ethernet RJ45 Socket	30 – Status LCD Display

- To avoid risk of damage or electric shock, ensure the reader and its charger are always protected from rain or splashes of water.
- Fully charge the reader's internal battery before the first use of the reader.
- Fully charge the reader's internal battery before events.
- Fully charge the reader's internal battery after use and prior to storing.
- The reader's internal battery should be fully charged every two months if the reader is not used for some time.

A Quick Look at your TM V1 Reader

Below is a quick explanation on the front panel layout of your TM V1 Reader. Detailed explanations can be found by clicking on the appropriate label in the text below the picture.
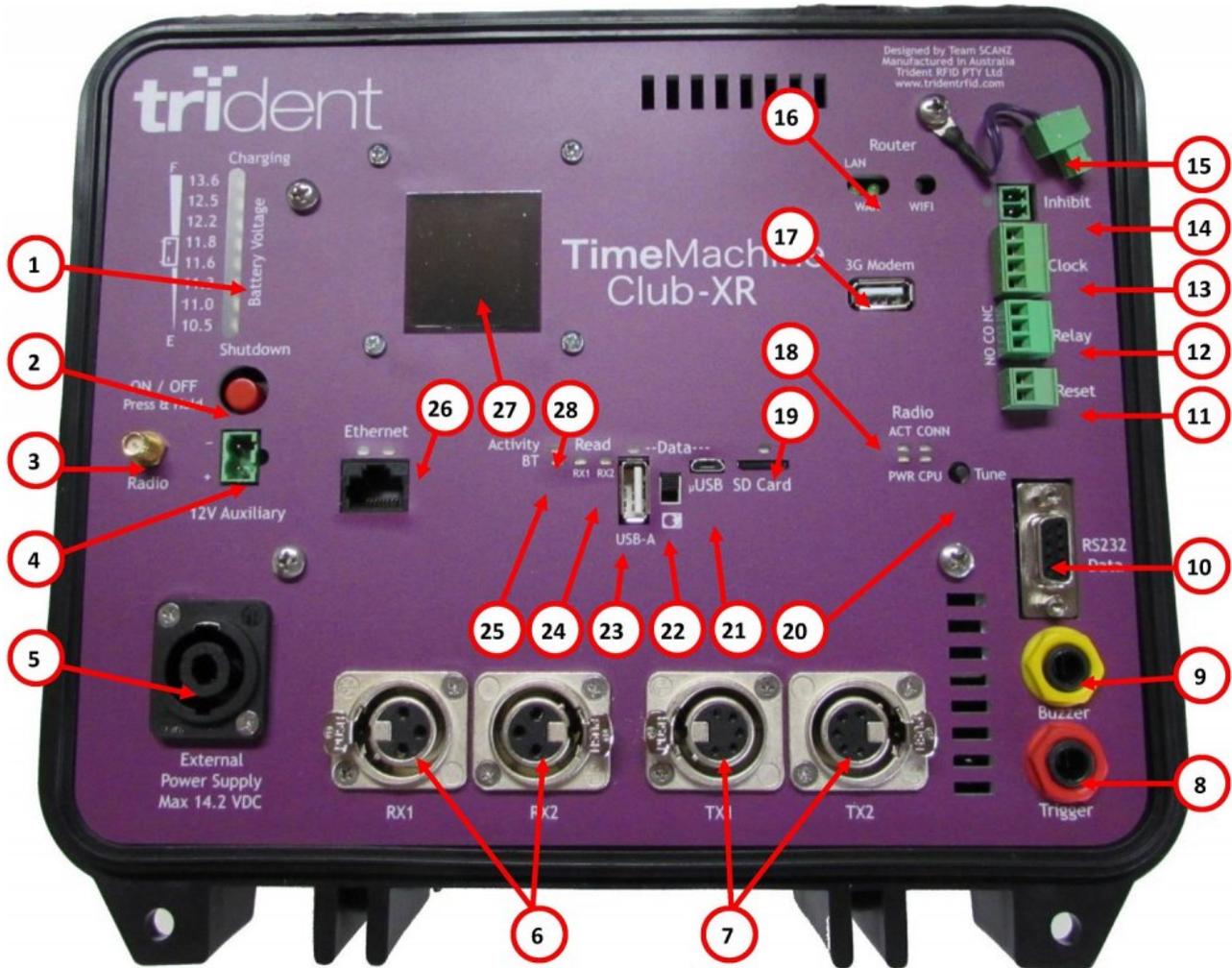
FIGURE 1 –TimeMachine Club-XR Front Panel

1 – Battery Voltage Indicator	2 – Power Button
3 – Radio Antenna Connector	4 – Auxiliary 12V Output
5 – External Power Socket	6 – Receive Loop Sockets
7 – Transmit Loop Sockets	8 – External Trigger Socket

9 – External Buzzer Socket	10 – RS232 Data Port
11 – Reset Connector	12 – Relay Connector
13 – Clock Connector	14 – Inhibit Connector
15 – Inhibit Plug	16 – Router Indicators
17 – 3G Modem USB Socket	18 – Radio Indicators
19 – Micro SD Card	20 – Transmit Tune Button
21 – Micro USB Socket	22 – Data Mode Switch
23 – Data USB Socket	24 – Receiver Status Indicators
25 – Bluetooth Indicator	26 – Ethernet RJ45 Socket
27 – Status LCD Display	28 – Tag Read Activity Indicators

- To avoid risk of damage or electric shock, ensure the reader and its charger are always protected from rain or splashes of water.
- Fully charge the reader's internal battery before the first use of the reader.
- Fully charge the reader's internal battery before events.
- Fully charge the reader's internal battery after use and prior to storing.
- The reader's internal battery should be fully charged every two months if the reader is not used for some time.

Getting Started – Beginners Overview

In this topic we will cover off what you need to know if this is your first Trident Time Machine, and set you on the path to becoming a Time Machine Expert User.

The steps below are designed to show you how to connect up to your reader using our base model – the Club Lite, see a tag being read and get a nice feeling.

You will need a location were you can run over the mat (antenna) safely or pass timing tags (chips) easily over the mat, place your computer and maybe have power available for your computer. The environment around and under you can have an affect on the read height (Dont freak out about that at this stage.)

Step 1: Charge your Reader

- When you first receive your reader, place it on charge and charge the battery fully.
- Always make sure the battery is charged before and after a race.
- If the unit is in storage for extended periods, please be sure to charge it approximately every 2 months. This will prevent damage to the internal battery.

To charge the unit, plug in your Trident charger to mains power and connect the external power supply plug to your reader.
The plug needs to be turned clockwise once inserted.
You will hear a "Click" once it is locked in.

There is a row of LEDs which indicate the voltage of the battery inside the reader.

When you plug the charger in you will see the LEDs cycle up as the battery charges. When it is full the cycling will stop and the blue led will light. It will only happen when the TM is turned off.

While the blue LED is on the battery is trickle charging. Once the battery has been trickle charging for a while, the blue LED may start turning on and off every few seconds. This is normal and it means the battery is very well charged.

Once charged you can disconnect the adapter by placing your finger on the silver locking device and sliding it upwards, then turning the adapter anti-clockwise.

> ✳ Note: Always recharge within 24 hours after use. Get into this habit to ensure you get optimum battery life.

If you use anything other than the approved Trident mains charger will void all warranty and may cause damage to your reader.

> ❗ Always time an event on battery only. Generators and Power Supplies can create electrical "noise" which can have drastic effects on tag (chip) read rates. Make sure you understand what "noise" is. Pay close attention to your battery indicator and always have an auxiliary battery ready.

Step 2: Install Timing Software

Trident systems are compatible with a range of timing software packages. We are completely agnostic and happy to support whatever timing software you choose. It's always a simple task to set the proper outputs for your software and we are happy to talk with your software provider.

What we are going to use in this case to get tag data flowing to your computer is our free software "TinyScore" – a simple, no fuss application you can simply put on your desktop. With the click of a button you can export race data out of your Trident reader into an excel spreadsheet. Simple as that.

Download our "Trident TinyScore" demonstration software below. If you already have your own software you can choose to bypass this and connect with your own. We do not provide support for connection issues with third-party software so you may just want "TinyScore" to see that all is OK with your Trident Time Machine.

<div style="text-align:center; border:1px solid #6b2c5f; padding:10px;">Download TinyScore Now</div>

Download our "Trident TinyScore" demonstration software above.

1. Follow the prompts to install any required prerequisite software and the TinyScore application. A "Trident TinyScore" shortcut will be placed on the desktop to start the application.
2. TinyScore's default settings (on the Reader Setup tab) will allow you to connect to the reader using an Ethernet cable.
3. You can press the F1 button to open the TinyScore help file which gives you a comprehensive guide on using the software.

> ✱ If your computer does not allow TinyScore to run, temporarily turn off your virus protection and firewall and reinstall TinyScore. Once TinyScore is installed turn these settings back on.

Step 3: Configure the Network Settings on your Timing Computer

The connection method below is based around our Club Lite reader. If you have purchased a XWR or XR models these will have inbuilt DHCP and WIFI, which can assign your computer an IP Address.

The method below has been written using a computer running Windows 8.1. Screen shots are at the bottom for those who need a visual story. Alternatively do a google search or follow this Link

1. On your Timing Computer, right click the Microsoft Windows **Start** button and select **Network Connections** from the list. You can also access from the "control Panel" and select "Network and Sharing Center", then "Change Adapter Settings".
2. Right-click the **Local Area Connection** associated with the network interface card (Fig 1) and select **Properties**. The "Ethernet Properties" dialog appears (Fig 2).
3. Scroll down until you see "Internet Protocol Version 4 (TCP/IPv4)"
4. Click to select **Internet Protocol (TCP/IP)** and then click **Properties**. The "Internet Protocol Version 4 (TCP/IPv4) Properties" dialog appears (Fig 3).
5. Click the **Use the following IP Address:** button and then type the following numbers:
   a) IP address: 192.168.0.50 (The TM Reader's default IP address is 192.168.0.101, you must set your IP address to 192.168.0.xxx, were xxx is a different number to your reader)
   b) Subnet mask: 255.255.255.0. Click **Ok** and then click **Ok** again.
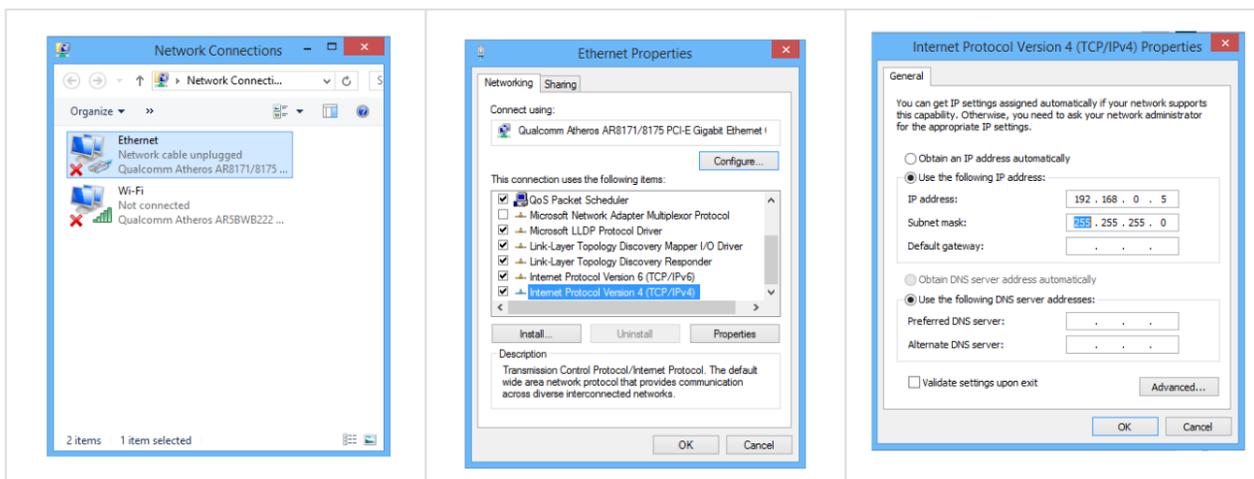6. Click **Ok** and then exit the Network Connections screen.

Fig 1 - Network Connections	Fig 2 - Ethernet Properties	Fig 3 - Internet Protocol

You can also check that you have connection to the reader by Pinging the IP address of the reader (Tinyscore does this automatically in the Reader setup tab). To ping your reader manually do the following:

1. On your Timing Computer, right click the Microsoft Windows **Start** button and select **Run** from the list.
2. Type in **CMD** and press the 'OK" button. This will open up cmd.exe in a new window.
3. Type in the Following ping 192.168.1.101 and press the enter key on your computer.
4. Your PC will Send a signal to the Reader IP address and get a response back. You should get 4 packets sent / 4 received / 0 Lost.

Entering CMD into Run screen

Ping 192.168.0.101 - Succesfull
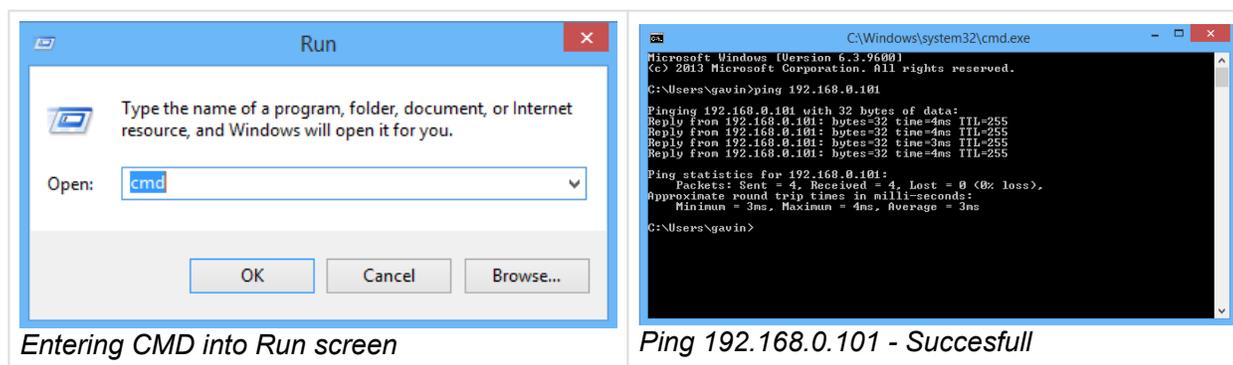
Step 4: Connecting Your Timing Mats

Now your TM Reader is charged and your computers network settings are done. Its time to plug in a mat or mats to your reader.

The mat does more than just look good, its also the antenna that powers your tags and receives back the signal once your tag is powered.

Notes:

• Your mat should always be unrolled and sitting flat before plugging it into your reader.
• You are not to move the mats into position via the cables, as this will void the warranty.
• Mats in series (the runner will move over the mats in succession) need to be 1.2 metres apart to create the best possible field. Refer to "Ultra Mat Configuration".
• Most rule books that relate to electronic tag timing say "The leading edge of the Mat needs to be on the finish line". Consult with the Event manager or Technical Delegate at your event as mats may need to be place prior to or after any finishing Gantry or chute.
• You need to look after your mats and clean them post event.

Figure 1 RX (3 Pin)

Figure 2 TX (5 Pin)

Plugging a mat into your reader:

Each mat has a male Rx Plug 3-pin (Figure 1) and a Tx Plug 5-pin (Figure 2) which should be plugged into the corresponding female sockets on the reader.

Align the pins on the RX plug with the RX connector on the reader, gently push the plug into the connector until it clicks into place.

Align the pins on the TX plug with the TX connector on the reader, gently push the plug into the connector until it clicks into place.

To remove the mat plug, you must first hold down the unlock lever on the side of the socket, then gently pull the mat plug out of the socket.

Step 5: Turning on the Reader

Before you go and Press the Red ON/OFF Button lets make sure of a couple of things.

1. Ensure that the Data Mode Switch (insert picture) is in the "UP" position.
2. Plug your Ethernet cable into the reader and your computer (Figure 1). (NB: you do not require the crossover adaptor)
3. Make sure your timing computer is on.
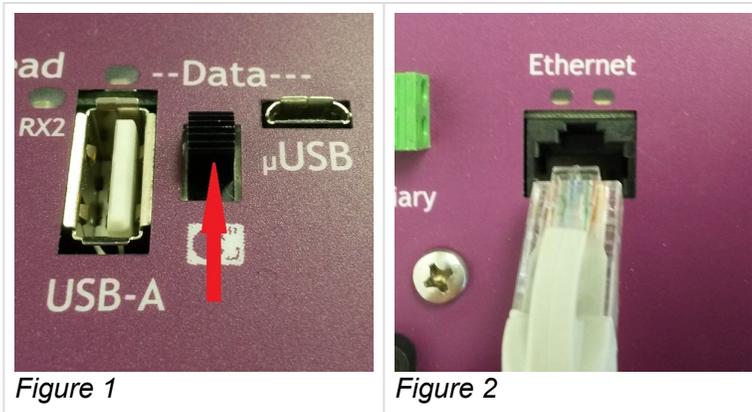
Figure 1   *Figure 2*

Power on the reader by holding down the power button for about 3 seconds. The battery voltage indicator and the Status Display will light up. The reader will perform its mat tuning procedure and emit two quick beeps when completed. You can also manually tune the antennas by pushing the Tune button on the reader.

Pass a test tag over the mat and look for an increase in the "Tags" counter at the bottom of the reader's screen.

> ✳ An audible beep from the reader may be heard, or may only be heard on once the tag "First Seen" event, or may not be heard at all depending on the Tag Read Beep Event setting. The beep will reset itself after the "tag timeout period" which is configurable in the config.ini settings. But the tag must leave the mat's energy field for this to happen.

The reader is also turned off by holding down the power button for 3 seconds. All indicators on the reader's front panel should go off.

> ❗ Always time an event on battery only. Generators and Power Supplies can create electrical "noise" which can have drastic effects on tag (chip) read rates. Make sure you understand what "noise" is. Pay close attention to your battery indicator and always have an auxiliary battery ready.

Step 6: Getting Tag Reads into Tinyscore

- Connect the reader to your timing computer with the Ethernet cable provided and TinyScore's default settings (on the Reader Setup tab) will help you connect to the reader.

> ✳ Press the F1 key on your computer to open the TinyScore help file for a comprehensive overview of how to get the best out of TinyScore.

The TM Reader will send data via the IP address to a TCP port. For a detailed explanation see "Streaming Live data from the TM Reader". The defaults are:

- 10000 – Raw data
- 10001 – Filtered Data

Below shows the Reader setup Tab and Bottom info display in TinyScore with a reader connected.

Once commination is established should firstly use the Set Reader Date/Time button so that Reader time matches your current time.

Precautions for Use

- To avoid risk of damage or electric shock, ensure the reader and its charger are always protected from rain or splashes of water.
- Fully charge the reader's internal battery before the first use of the reader.
- Fully charge the reader's internal battery before events.
- Fully charge the reader's internal battery after use and prior to storing.
- The reader's internal battery should be fully charged every two months if the reader is not used for some time.

Streaming Live Data from the Reader

You can stream tag data as it is read by the mats or loop to the reader as filtered data or raw data.

- Raw data is streamed by default from port 10000
- Filtered data is streamed by default from port 10001

If required, change the port numbers using the options outlined in Configuration options.

When streaming from the raw port, you will get every single tag read as a tag crosses any of the mats.

When streaming from the filtered port you will usually get only 3 records from each tag as it crosses one or more mats in quick succession. You can control which of the three filtered record types you wish to receive using the configuration option Filtered message types.

Via Ethernet

Time Machines other than the Club Lite have DHCP.

For users of Club Lite systems please refer to Getting Started – Step 3: Configure the Network Settings on your Timing Computers. Alternatively do a google search or follow this Link

For Readers that have DHCP your local area connection needs to be set to "Obtain a IP address automatically" . Alternatively you can hard code a IP Address to your PC as above.

A standard CAT-5 network cable (standard cable, not a crossover) is used to connect your computer to the TM Reader.

> ✳ Once connected, your computers Ethernet connection may show as 'Limited Connectivity'. This is due to the fact that your connection is not connected to the internet.

When Connecting to multiple readers via a wireless router or router with DHCP capabilities , make sure that the DHCP pools assigned by router does not overlap with the readers connected. If repeaters are required for a wireless network, these must be standalone units. Do not attempt to use the repeater mode in the Reader (this must always be set to 3G router mode).

Via WiFi

Time Machine readers that have a -X after the name have inbuilt WiFi. Connecting via WiFi will give the same functionality as using the Ethernet network cable.

Remember, a direct Ethernet connection is always the most reliable way of communication between your timing computer and your reader. i.e the fastest and most reliable network communications is always through a cable. WiFi connections can be compromised by outside factors including objects in-between you and the reader and interference from other wireless sources.

Your readers wireless network name should be configured by your distributor prior to shipping the reader to you. A easy way to find it is to simply look at your wireless connections prior to turning on the reader, once you turn the reader on the network name will appear in the available wireless network list on your computer.

The default password to connect to the network is 12345678

Once connected to the wireless network you will be able to connect to your TM Readers IP address and appropriate TCP Ports

Changing and Configuring WiFi Settings on your Time Machine.

The best method of changing configurations on the Inbuilt DHCP / WiFi unit in your TM Reader is by connecting up via Ethernet Cable

> ✱ The 3G WiFi Router in your TM Machine should only have changes as described below. Do not attempt any other changes as these will affect your TM Readers functionality.

Once connected to the network following the steps below:

1. Open a web-browser, type the default IP address "192.168.0.1" in the address field, and press **Enter**. At the prompt, enter the default User name: admin and Password: admin. Click **OK** to enter the router's management page.
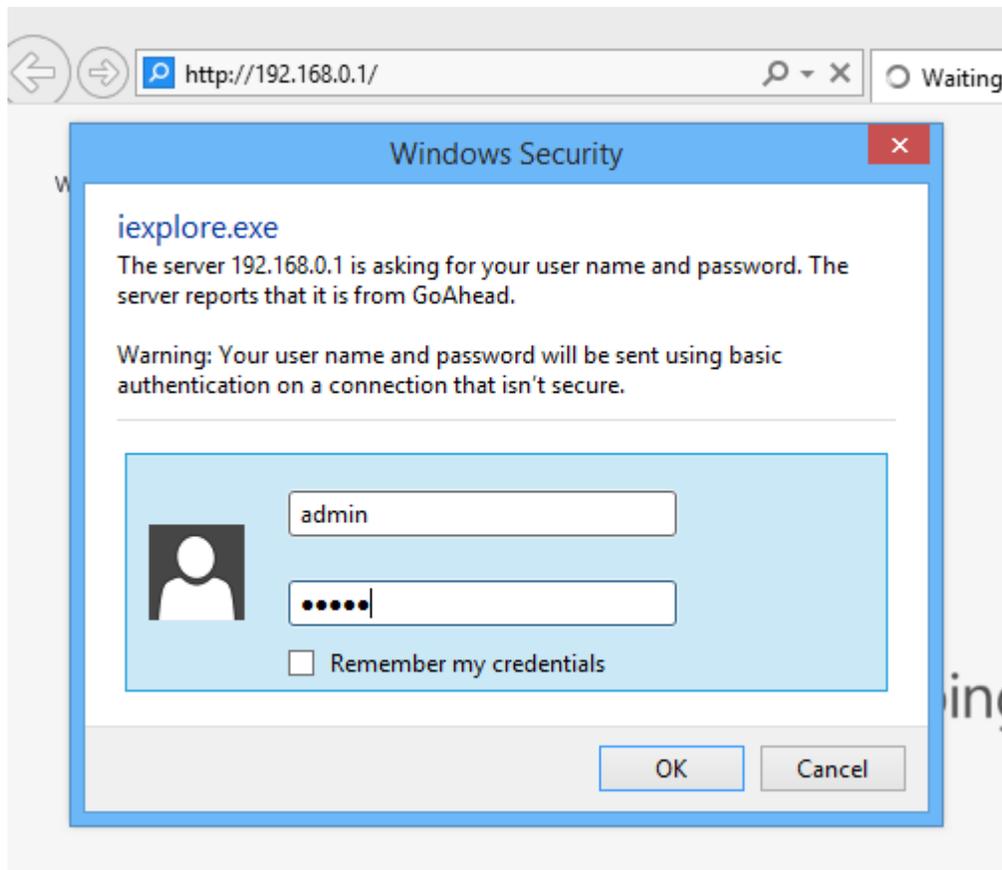
192.168.0.1 Username: Admin , Password: Admin

Changing the Network Name and Password.

- Once logged in select the " System Settings" icon.
- From the left hand list select "WiFi Settings ".
- You can change the Network Name overwriting the name in the SSID line.
- You can change the Password by overwriting the Password in the Password line.
- You must select the **Apply** button to save. The system will then re-boot.

Network Name and Wifi Password

Correct Work Mode

The 3G WiFi Router should be set to "3G Mode".

- To check or assign the correct mode, once logged in select the " System Settings" icon.
- From the left hand list select "Work Mode".
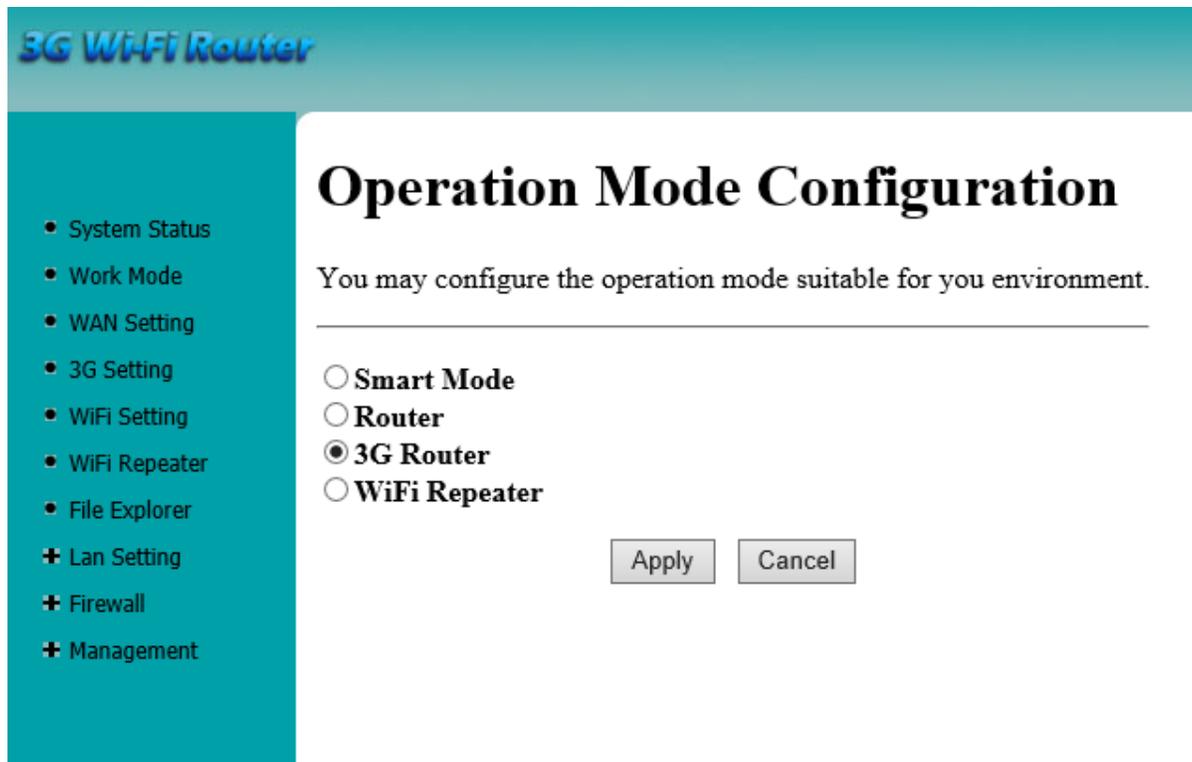
Correct Operation Mode showing

Changing the IP Address

You can change the IP address that the 3G WiFi Router assigns to your computer and that the TM Reader uses.

- Once logged in select the " System Settings" icon.
- From the left hand list select " LAN Setting ". Sub categories will appear. From these select "LAN".
- Change the IP address and select Apply. The system will then re-boot.
- You will then need to change the IP address on your computer and log back in to the 3G WiFi Router using the IP address entered.

Local Area Connection Setting

- Next you will need to change the DHCP settings that your 3G WiFi Router uses to assign a IP address to your computer.
- Once logged in select the "System Settings" icon.
- From the left hand list select "LAN Setting". Sub categories will appear. From these select "DHCP Server".
- Change the "Start IP Address" to match the new IP address that you have set the LAN to. i.e LAN is 192.168.1.1 then set Start IP Address to 192.168.1.121
- Change the "End IP address" to match the new IP address that you have set the LAN to. i.e LAN is 192.168.1.1 then set Start IP Address to 192.168.1.200
- Change the "Default Gateway" exactly new IP address that you have set the LAN to.
- Select **Apply**. The system will then re-boot.

Local Area Network Settings

   • Start the IP pool range at 121, this allows room for future readers.

When Connecting to multiple readers via a wireless router or router with DHCP capabilities , make sure that the DHCP pools assigned by router does not overlap with the readers connected. If repeaters are required for a wireless network, these must be standalone units. Do not attempt to use the repeater mode in the Reader (this must always be set to 3G router mode).

Via Radio Modem

1. Connect your USB Radio Modem to your computer through an available USB port, this may take several minutes to configure the driver.

Note: if the driver does not configure, you will need to go to your device manager and right click on the USB drive it is connected to (at this stage it will be saying un-configured),
click on update driver, and then click on search for driver via internet. This should configure the driver for you. If not please contact Trident support.

To discover what com port setting your PC has assigned the USB Radio Modem, select 'Device Manager' on your computer, click on 'Ports (COM & LPT)'.

1. Once the driver is installed you can connect and stream data from the reader via radio. Communication is at 115200 baud. You can connect via the com port direct into your software or via ' TinyScore'

As with any wireless communication, WiFi or Radio (900MHz) can be liable to interference from local "noise" factors. Always test the area where you will be operating your reader prior to timing an event. This will save you unnecessary stress on the day. Remember, a direct Ethernet connection is always the most reliable way of communication between your timing computer and your reader, i.e the fastest and most reliable network communications is always through a cable. If for some reason, you lose communication with your reader, do not PANIC. You can always download the raw data from your reader.

In the data string that is sent with each tag read the 3rd Character can be set, so if you have multiple readers send data to your Radio USB Modem, each reader can be uniquely identified.

To Add – Com to IP program

Via Micro USB Cable

When the Data Mode switch is in the UP postion (Com MODE) and the Micro USB cable is plugged in and connected to your computer Filtered data can be streamed to to the COM Port assigned to the Mico USB Connection.

In order to set this method up you will need to set the log filtered to USB option in config.ini to T and also install the driver for the Micro USB to act as a COM port. You can only stream Filtered data via this method.

The USB driver is native to windows 10 and will self install. For Windows 8 and 8.1 64-bit machines you will have to disable the digital driver reinforcement prior to installing the USB driver. Windows 7 already has digital driver reinforcement disabled. For Earlier versions of Windows please refer to Google.

Recommended Baud is 115200. Your timing software should automatically locate any active com ports if it does not please refer to installing Trident Micro USB below.

Installing Driver for Trident Micro USB

Download Trident Micro USB Driver

The Example below has been done using Windows 8.1 64-bit. Screen shots are at the bottom for those who need a visual story.

Select the *Download button *and download to a location on your Computer that you locate.

1. On your Computer, right click the Microsoft Windows **Start** button and select **Device Manager** from the list. Device Manager can also be accessed via 'Control Panel' on your computer.
2. Right Click and select **Update Driver Software…**
3. Select **Browse my computer for driver software**.
4. **Browse** to the Folder on your computer, where you saved the usbser.inf file to, ans select the **next** button.
5. Select **Chose to install driver software anyway**.
6. Once installed you can look in **Device Manager**, under **Ports (COM & LPT)** to see what COM port number has been assigned to the Micro USB
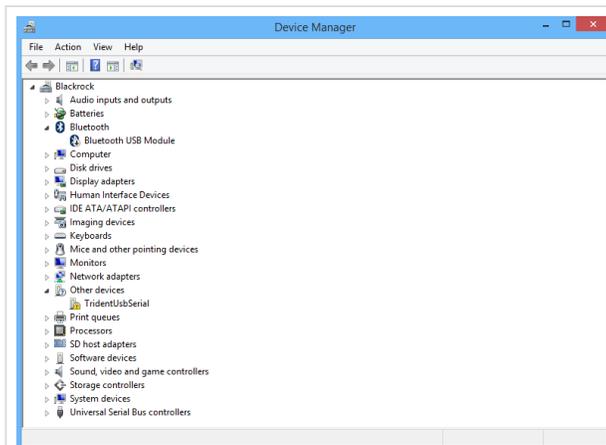
1. Device Manager showing No driver installed
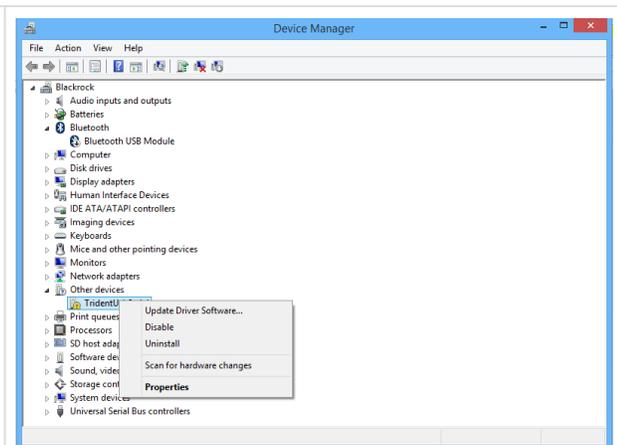
2. Right Click and select 'Update Driver Software
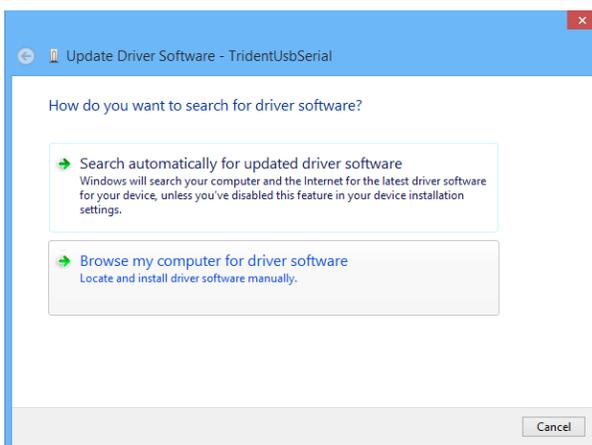
3. Select 'Browse my computer for driver software'
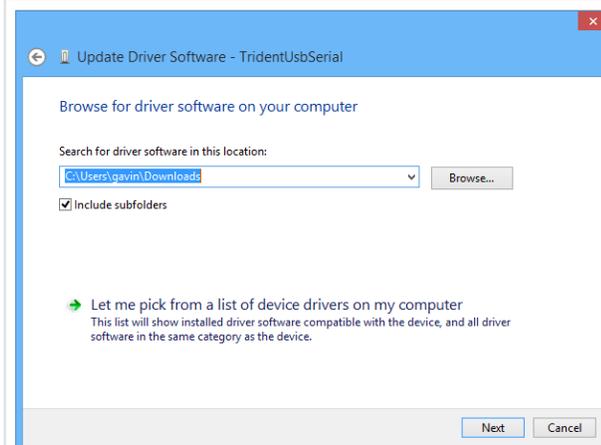
4. Folder located where usbser.inf saved to.
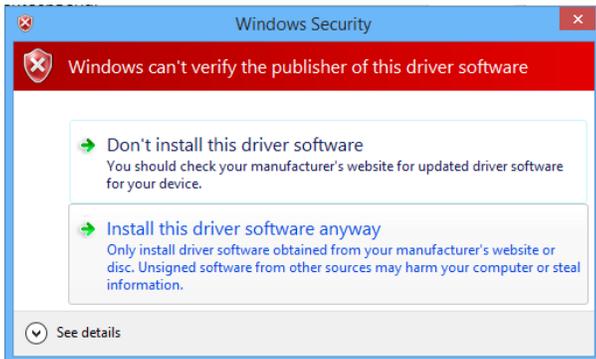
5. Select 'Install this driver software anyway'
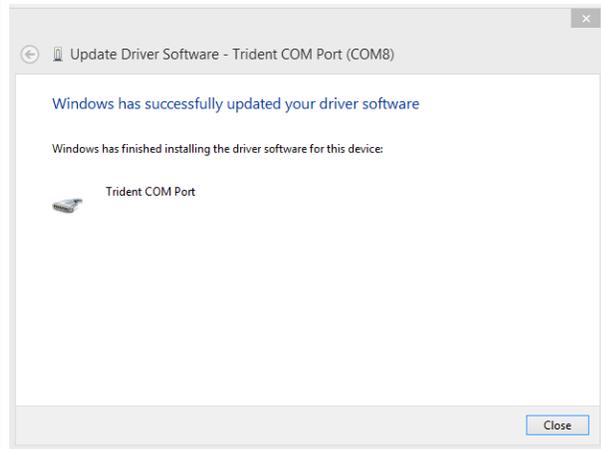
6. Driver successfully installed
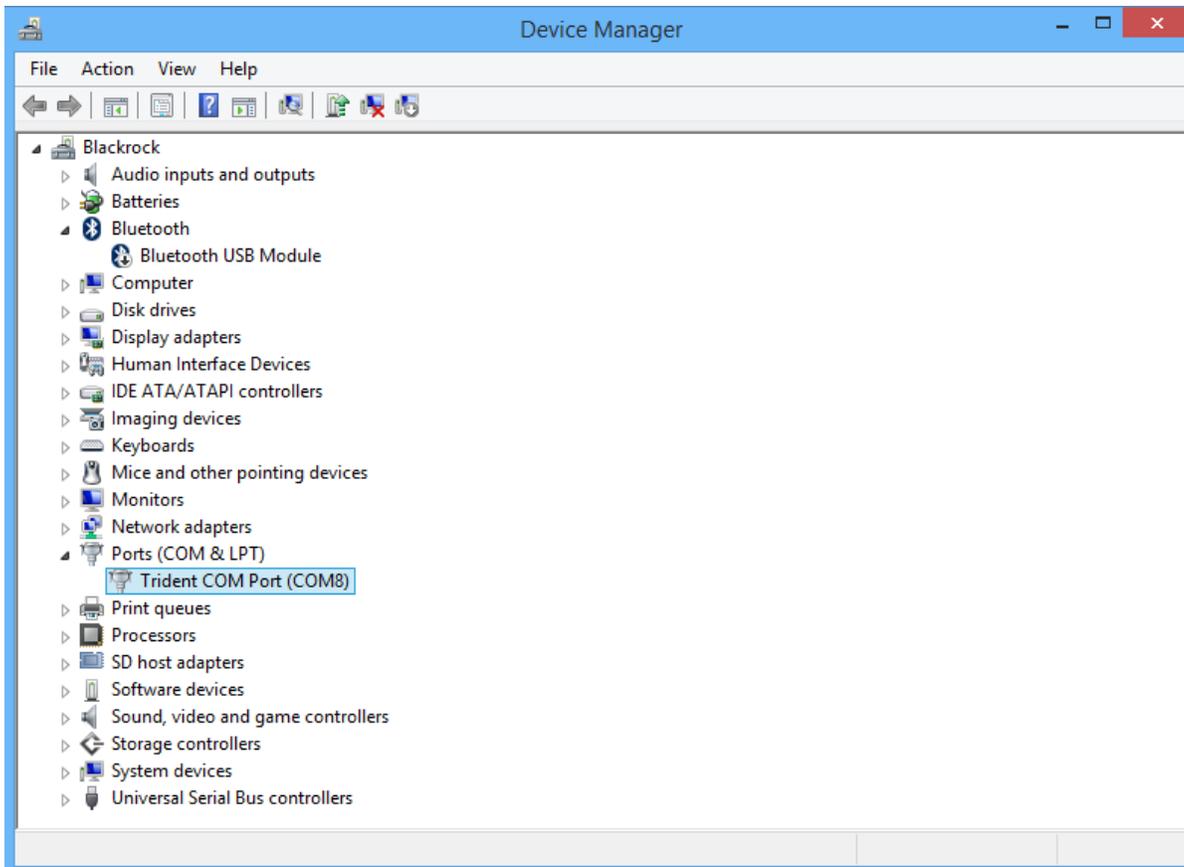
Device Manager showing the COM port number assigned to MicroUSB

How to disable driver signature enforcement under Windows 8 and 8.1

Step 1: On your Computer, right click the Microsoft Windows **Start** button and select **Search** from the list.

Step 2: Type "startup options" to start searching for programs. Click on "Change advanced startup options"
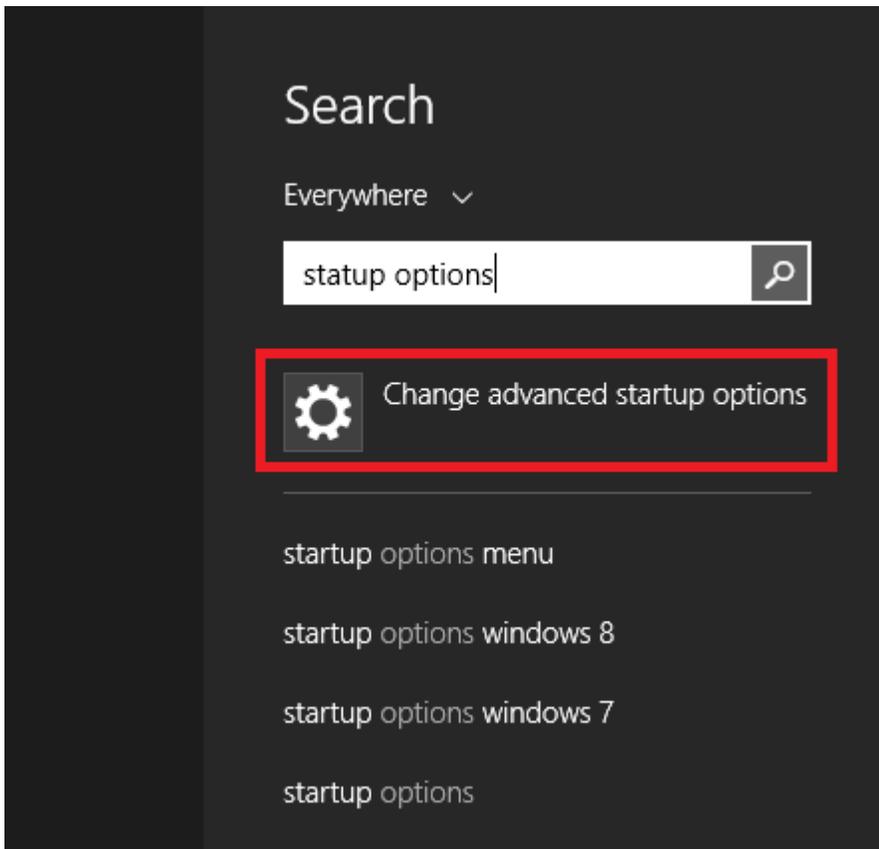
Step 3: Click on "Restart Now" under "Advanced Startup"
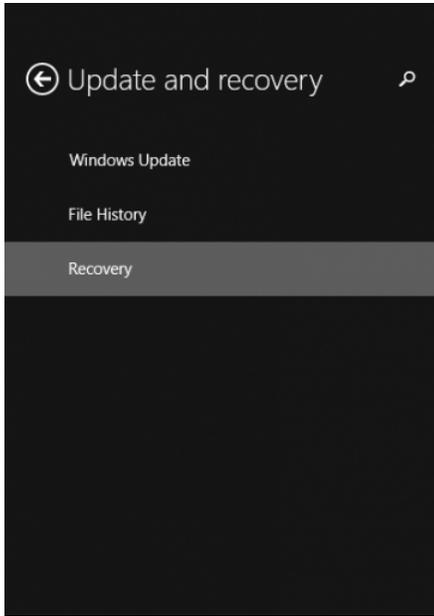
Step 4: Click on "Troubleshoot"
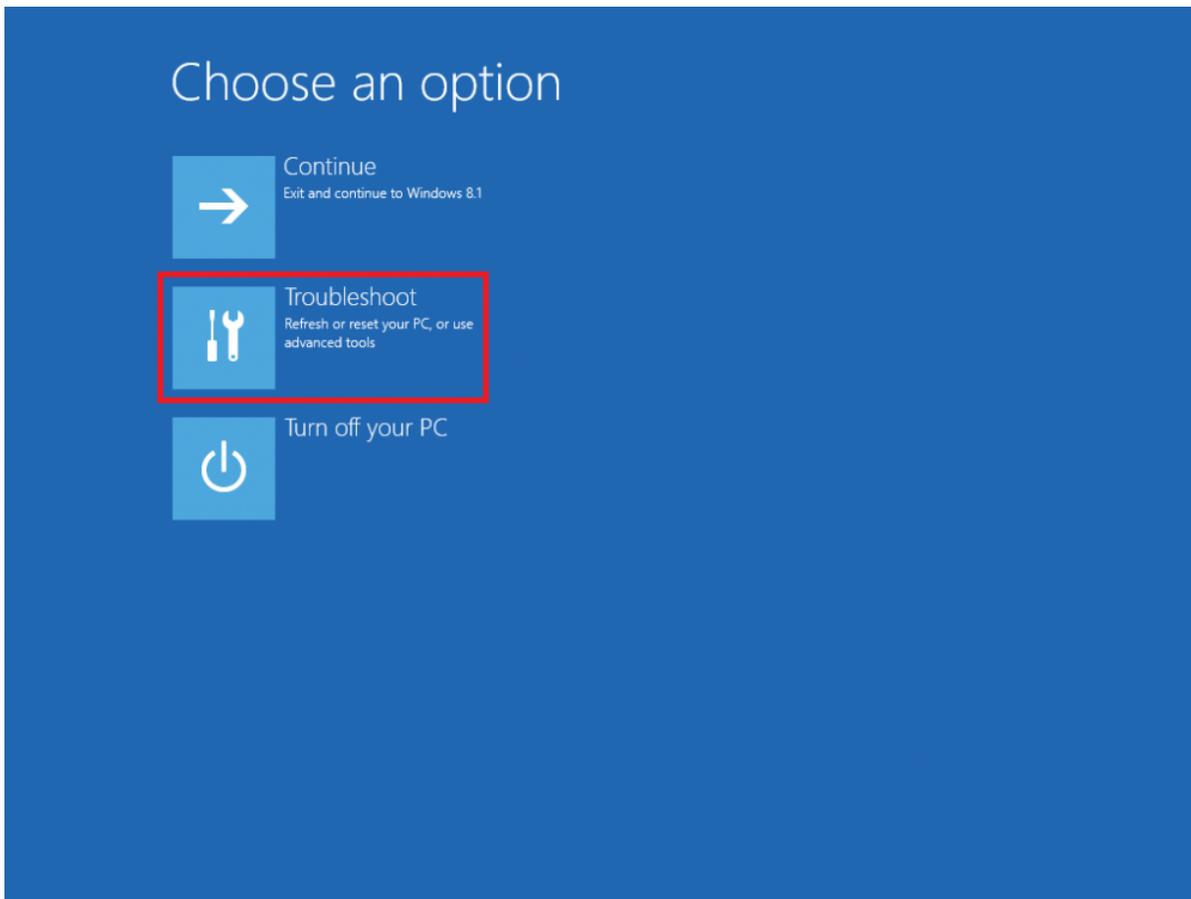
Step 5: Click on "Advanced Options"
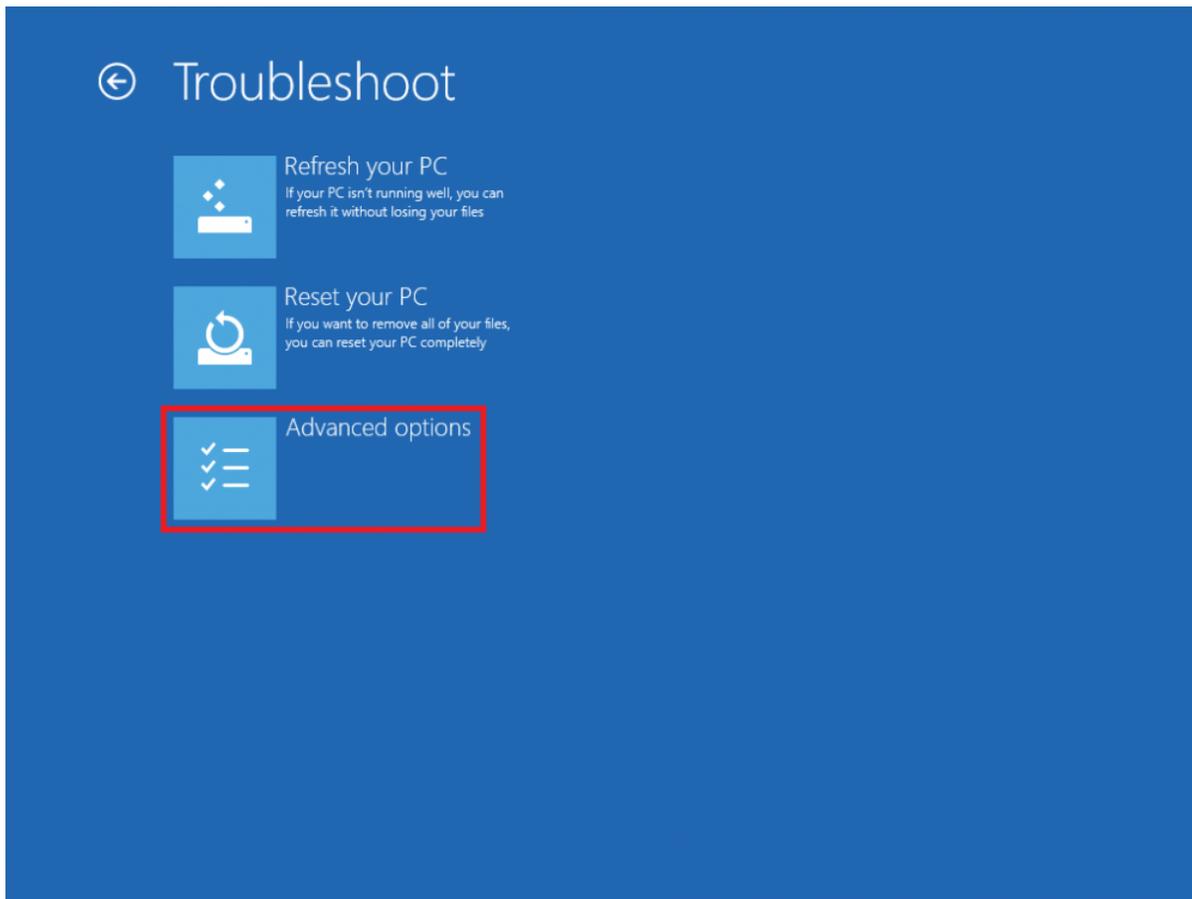
Step 6: Click on "Startup Settings"
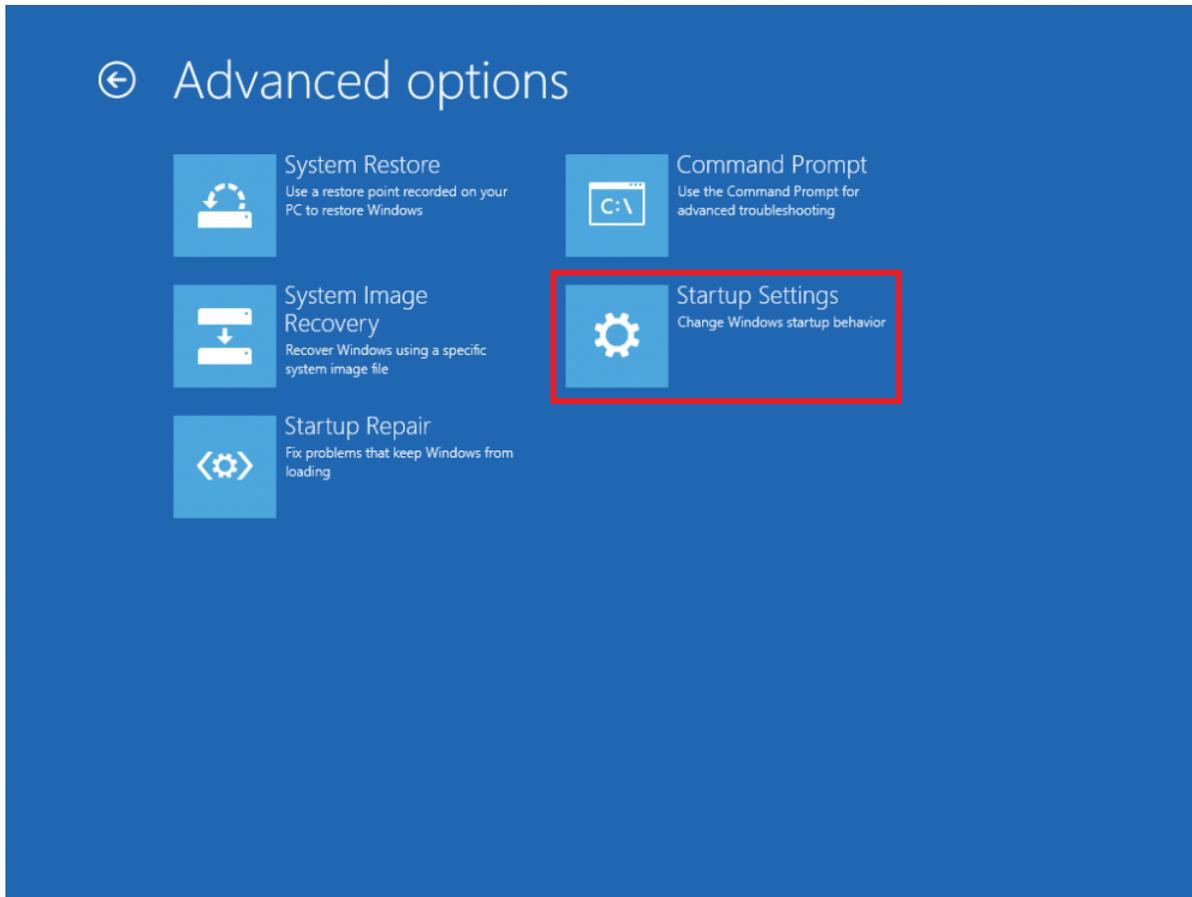
Step 7: Click "Restart"
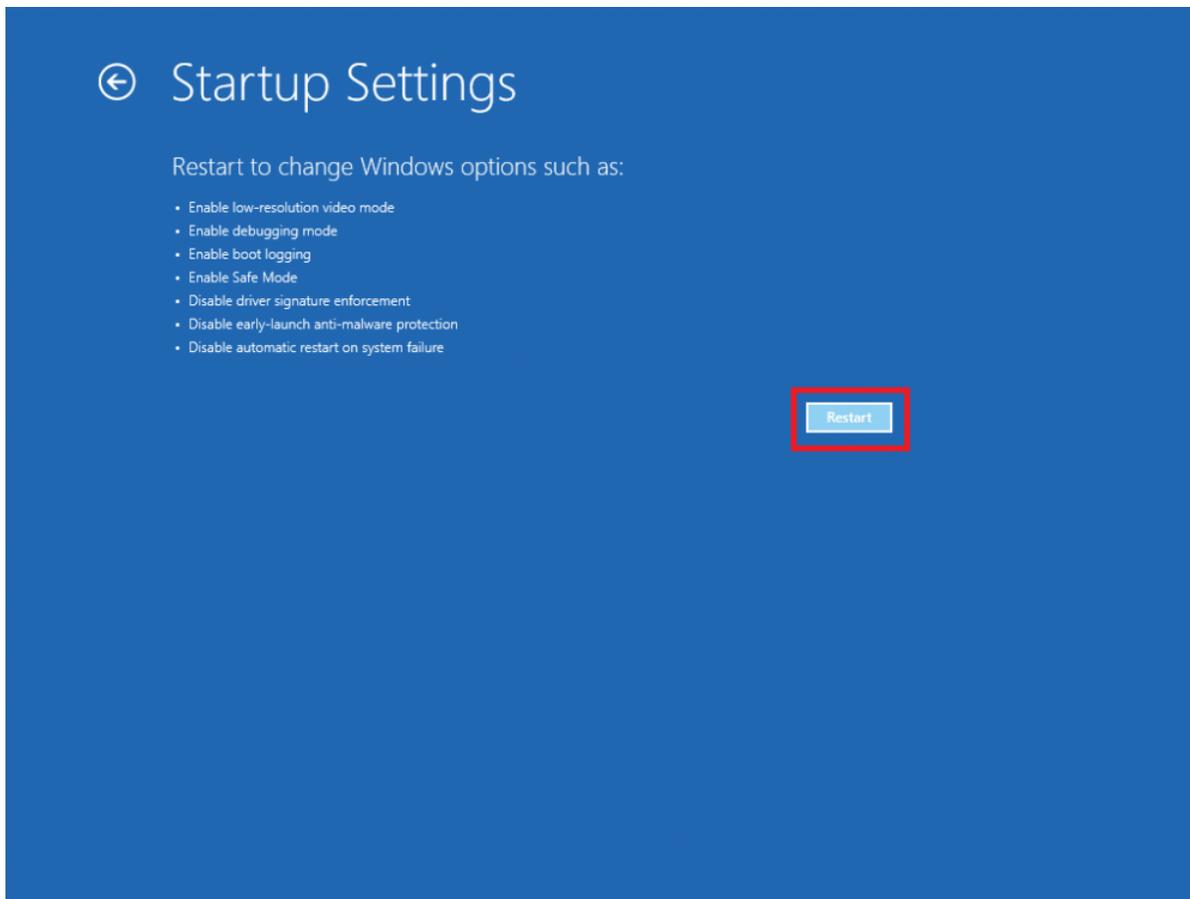
Step 8: Press 7 or F7 on your keyboard to disable driver signing

Windows will now reboot without driver signature enforcement, and you will be able to install the USB driver.

Timing Mats

Trident mats have smart technology built right into the mats which provides superior tag read performance and reliability over other timing systems. You can only use Trident Smart Mats (UltraMats) with Trident TM series readers.

TM Readers can take up to 4 mats for Pro series and 2 Mats for Club Series. The Active series can take up 4 timing loops.

Mats are available as 3m or 6m Mats

Mats come with a 10 meter cable and are terminated with a 3-pin XLR receive plug and a 5-pin XLR transmit plug. The receive cable can be plugged into either RX1 or RX2 socket(s) on the reader and the transmit cable can be plugged into either TX1 or TX2 socket(s) on the reader. It is advisable to plug your first mat into the reader's RX1 and TX1 sockets, and if applicable plug your second mat into the RX2 and TX2 sockets, to avoid possible confusion when unplugging a specific mat.

> ✳ 3m and 6m Ultra mats should have at least 1.2m between rows of mats when they are placed in series, and when mats are place in parallel the edges of the mats should be touching (no overlap is required).

> ✳ When setting up an active loop, the area inside the loop should be 0.8 meters (32in) wide. If you are using more than 1 Active time loop you should have 0.8m (32in) gap between loops.

> ❗ Do not allow traffic (vehicles) to drive over your UltraMats. Each mat has a TX and RX smart box attached to each mat. These are robust but can be damaged if driven over. When placing mats on rocky or rough surfaces remove any sharp stones or objects that may cause damage to the cabling on the underside of the UltraMats.

> ❗ Please take care not to damage the mat cabling e.g. Moving the mat by dragging it around by the cable. Damage to the mat cabling will not be covered by the product warranty.

! When timing an event, any excess cabling must NOT be stored under the mat(s) as this may affect performance. Do not allow power cables or other electronic cables to be placed under your mats at timing points.

✳ When you insert the mat plug into the reader, it gets locked in place. To remove the mat plug, you must first hold down the unlock lever on the side of the reader socket, then gently pull the mat plug out of the reader socket.

! Always time an event on battery only. Generators and Power Supplies can create electrical "noise" which can have drastic effects on tag (chip) read rates. Make sure you understand what "noise" is. Pay close attention to your battery indicator and always have an auxiliary battery ready.

Ultra Mat Configurations

Below are typical configurations used in timing points.

Mats connected in parallel MUST be touching each other as shown in the diagram, do not leave a gap between the mats when using this configuration.

Cabling back to the reader must be laid up the CENTER of the mats so that both cables exit the mat nearest to the reader.

Your mat should always be unrolled and sitting flat before plugging it into your reader.

You are not to move the mats into position via the cables, as this will void the warranty.

Mats need to be 1.2m apart when there are more than one line of mats to create the best possible field.

Mats may be centered on Finish Line or offset in front of the Finish Line depending on the desired relationship of the two systems and the surrounding environment.

You need to look after your mats and clean them post event.

2 Mats in series (one timing point)

2 lines of 2 Mats, edges touching with joins staggered (one timing point)

2 separate timing points of 2 Mats in series

4 Mats in a line (one timing point). For 6m mats, extension cables must be used

1.2m gap

Trident TM

4 mats in series (one timing point)

3m and 6m Mats with joins staggered (one timing point)
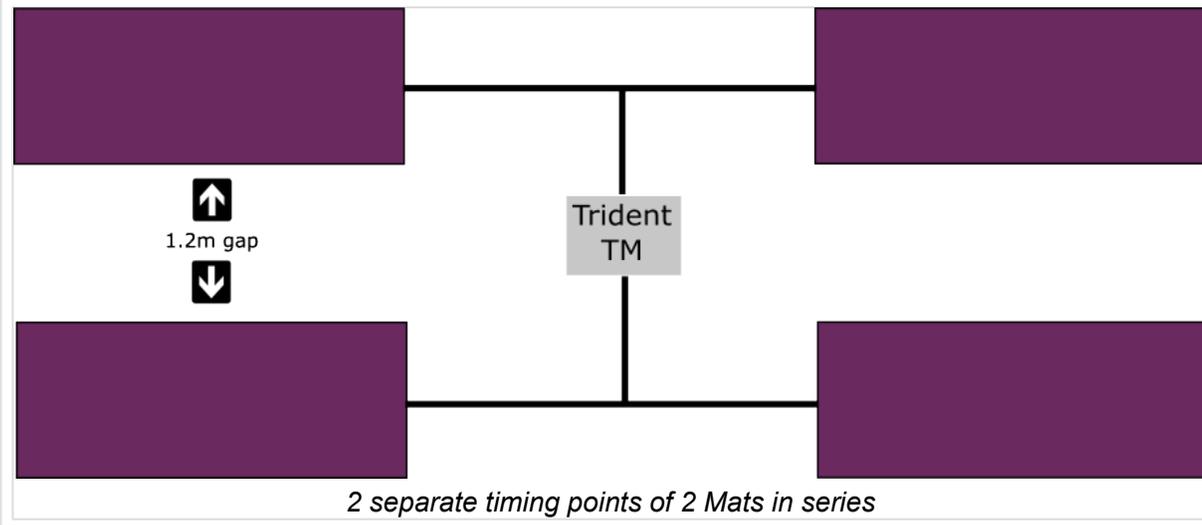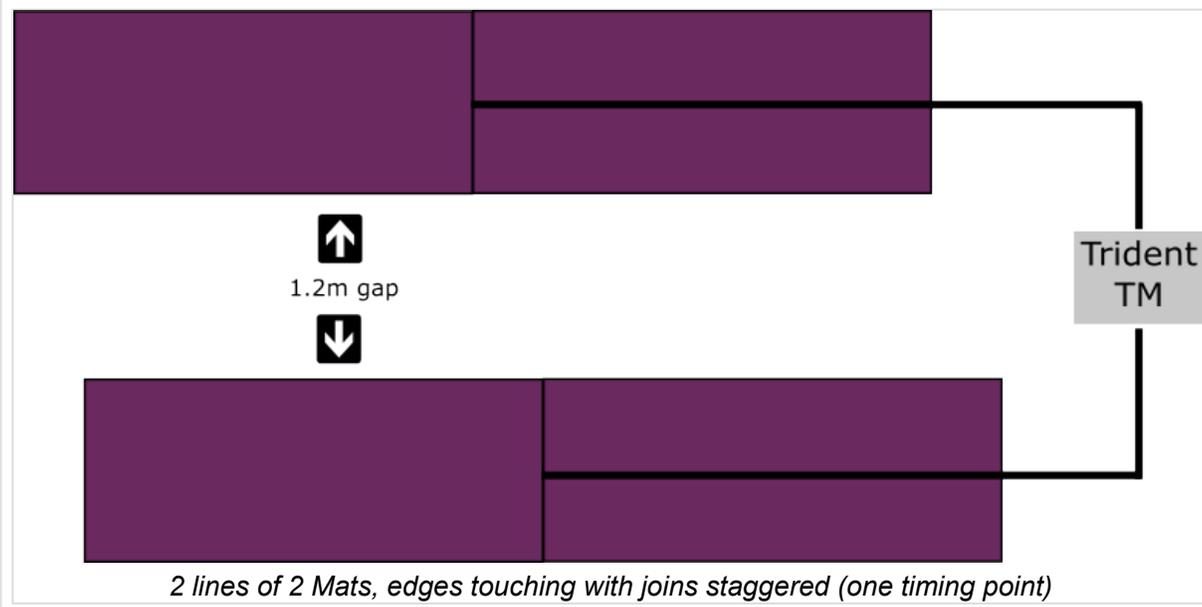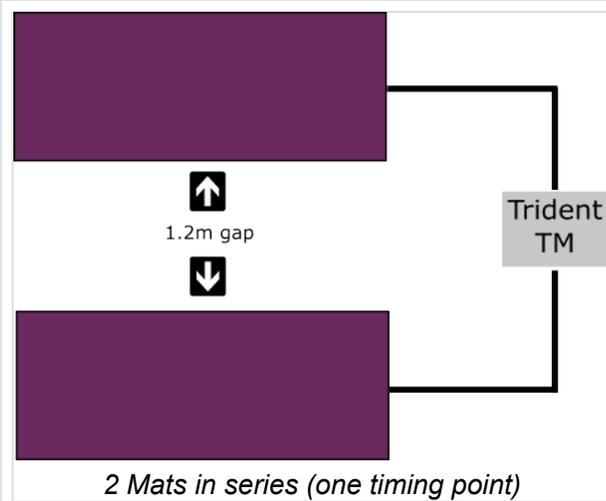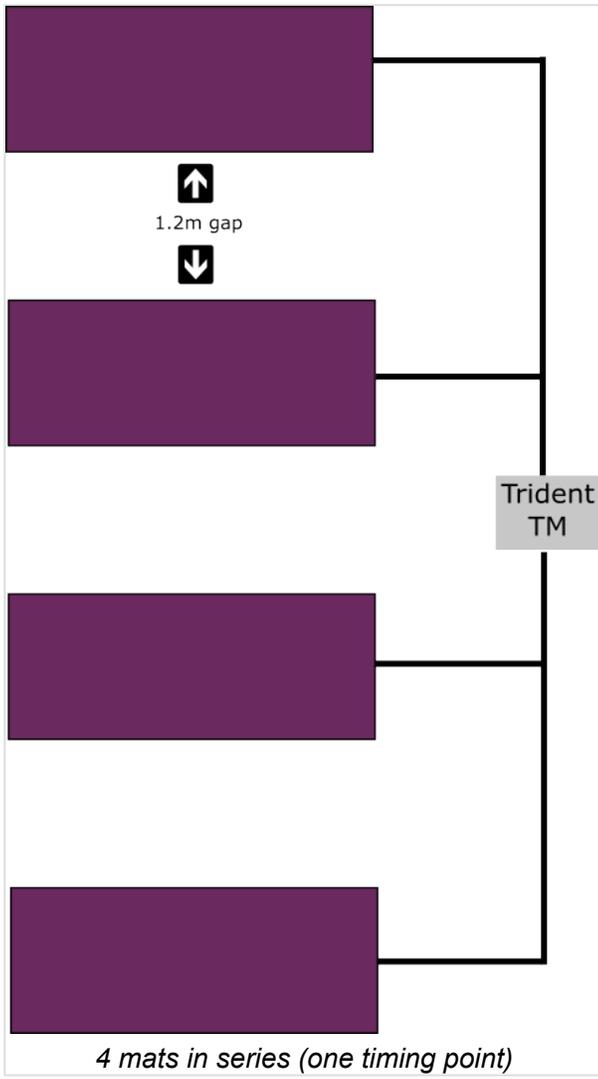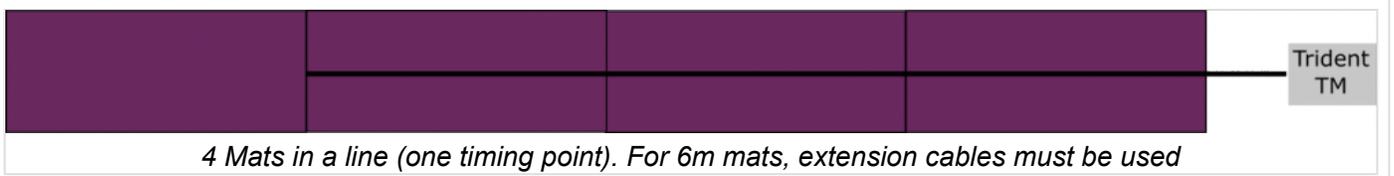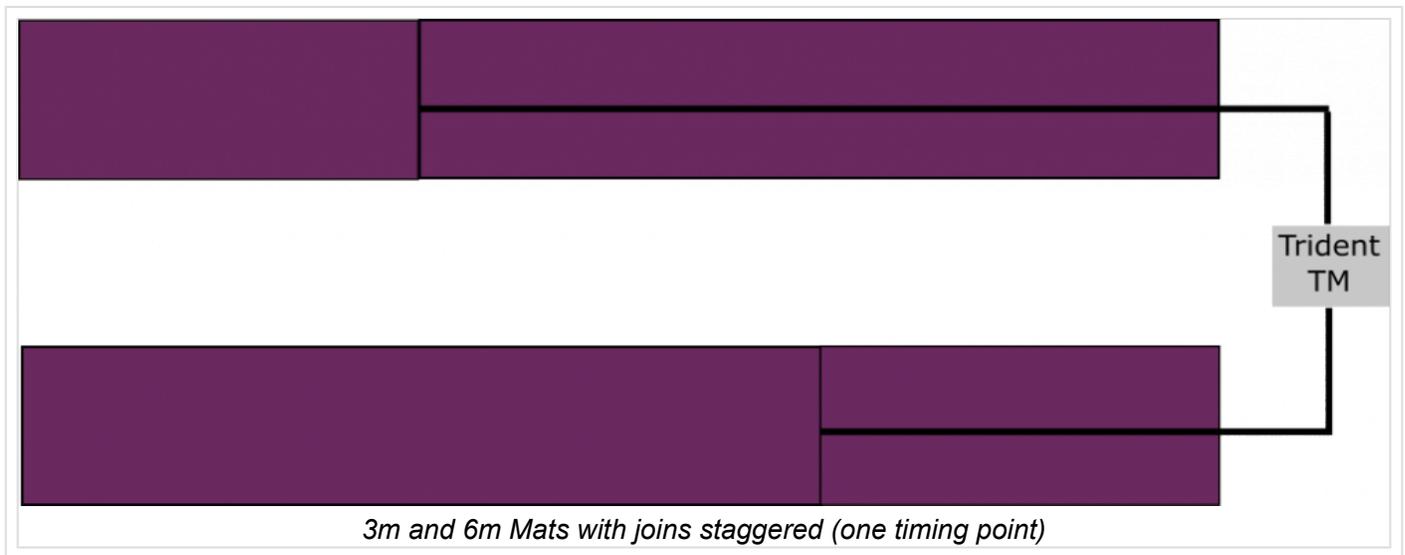
Active Loop Configuration

Active Loops are used with Active Tags. An active loop has receiver and no transmitter – the tag being powered up by its internal battery.

The standard loop gives an effective coverage of 8 metres. Customised shorter loops are available.

Active Loops can be placed directly onto the ground, but you must be able to hold the loop to the ground so that the Loop does not lose its form or move as athletes/bikes/vehicles pass over the loop.
For Motor Cross or another in-ground situation the Loop can be housed in a 50mm conduit under the track surface with the conduit on a slight angle to let any water escape.

When laying loops out, the loop width shall be 800mm (80cm).

When using 2 or more active loops you MUST have a minimum of 800mm (80cm) between the edges of the two loops. It is recommended that 2 loops be used in series at each timing point.

Each loop is connected to the loop controller with a hirschmann connector. There are 2 different types of connectors on each loop controller.
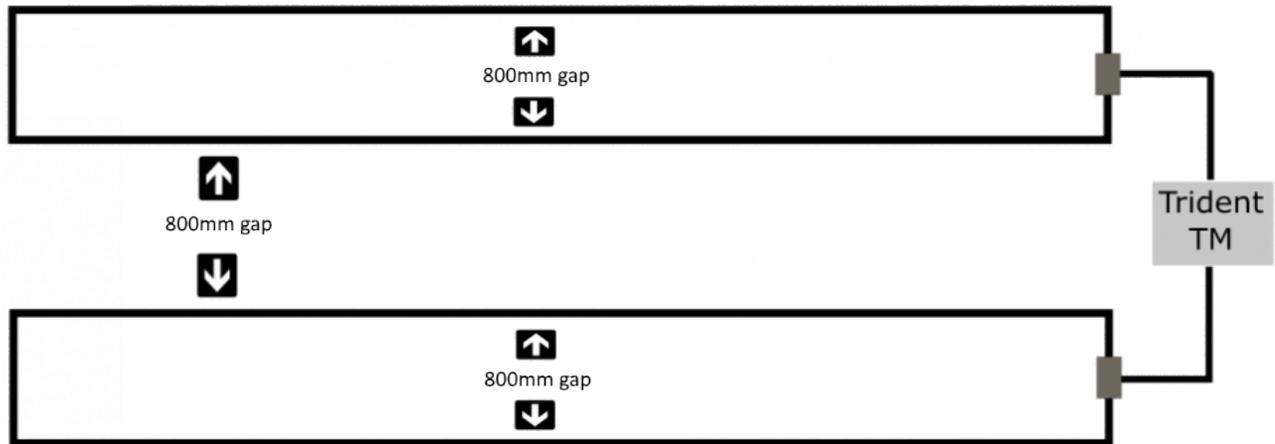
2 Active loops connected to a reader

Care of Mats and Storage

Your timing mats should be cleaned and dried after each use. Make sure that the mats are dried prior to placing them in their bags. It is good practice to leave your bags open during storage, this allows any moisture that may be present in mats to evaporate.

After each use, do a physical inspection on the cables on each mat. If you find any damages please contact Trident RFID.

When rolling mats up for placement in bags, flip mat cable side up and starting at the non-cable end, Roll firmly, but not tight. Once rolled carefully lay the cable backwards/forwards along the width of the mat.

Do not stack other items on your mats during storage. Mats should be stored in a dry, cool environment.

Retrieving Data from your TM Reader

You may need to download the logged tag reads (raw or filtered data files) directly from the reader's MicroSD card in certain circumstances (for example, your timing computer was not communicating with the reader while timing an event or you are using the reader as a remote split point which is not connected via a network).

> ✳ The reader will not log any tag reads while connected to your computer using the MicroUSB cable.

Simply follow the following steps:

1. Move the data switch into the downward position.
2. plug the included purple MicroUSB cable into your computer USB port and connect to your reader via the Micro USB Socket .
3. Browse for the newly detected "Removable Disk" and look for the text file called "filtered.log" or "raw".log
4. Copy this to your computer's C: Drive (NB: do not copy to a directory, it must go straight to your C: Drive otherwise your timing software may not be able to map to it.
5. You now import the "filtered.log" file directly into your timing software (your timing software will have instructions on how to do this)

> ❗ You must SAFELY Eject the "Removable Disk Drive" created by the TM Reader prior to unplugging the USB cable. This can be done by right clicking the drive and selecting EJECT or via the USB icon in your task bar. Once you physically remove the Micro USB from the TM reader, the TM reader will restart automatically.

FTP Connection

Data can be retrieved from your time machine at any time via FTP, even while your Time Machine is running and capturing tag reads. That means that if for some reason you lose connection to your reader you can retrieve data mid event.

You need to make sure p60 and p61 exist in your config.ini file.

If you have set p60=anonymous and p61= (empty), then you will be able to connect and download log files with a browser like Internet Explorer. Please note that some browsers will not display the files correctly or let you save them to a folder.

Example of FTP download using Internet Explorer.

1. Connect to your reader via ethernet or wifi
2. Open Internet Explorer
3. In the address bar type ftp://192.168.0.101 (192.168.0.101 being the IP address of the reader)
4. Pan over the .log file you wish to download, right click and select 'save target as…'
5. Save the .log file to your selected
6. Import file into timing software
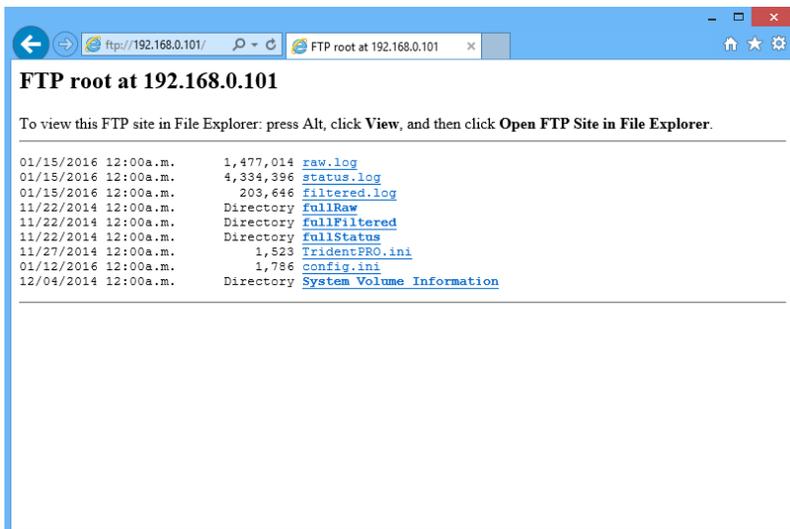
FTP connection with Internet Explorer

Note that ftp.exe which comes bundled with windows is likely not to work, since it is blocked by the windows firewall. A good replacement for ftp.exe is WinSCP, which can connect to the FTP server and is also scriptable, runnable from batch files etc.

Checking/Setting Reader Date & Time

It is important to have the readers' internal clock set fairly accurately so results in your timing software match what you would expect to see. You can view the reader date/time on the front screen just above the tag read counter. You must set the TM Reader time via an Ethernet or WiFi connection.

Trident supplied "TinyScore" can set the reader time. Once TinyScore is communicating with the reader, select the "Reader Setup" screen and click on the "Set Reader Date/Time" button to synchronise the reader date/time with your computer date/time.

Your timing software may have this facility.

Clearing Reader History

All current and Historical Tag data is stored on the SD card in the TM Reader. It is **good practice** to clear this history after each event is completed or prior to the start of each new event. You may chose to "download" and save these log files prior to deleting them.

> ✳ Once History is cleared it is GONE for good and you will NOT be able to retrieve it

History can be cleared by using software to send a command to clear the History or by deleting logs on the SD card via the Micro USB.

Clearing History Via Software (TinyScore)

- Connect to TinyScore via a Ethernet or WiFi connection.
- Once TinyScore is communicating with the reader, select the "Reader Setup" screen and click on the "Clear Reader History" button.
- You will be prompted to make sure you want to delete data. Select "YES" in you wish to proceed.

Clearing History Via Micro USB

- Move the data switch into the downward position.
- Plug the included purple MicroUSB cable into your computer USB port and connect to your reader via the Micro USB Socket .
- Browse for the newly detected "Removable Disk"
- Delete the files **filtered.log** , **raw.log** , **status.log** and **ethernetBackup.log** only.
- SAFELY Eject the "Removable Disk Drive" created by the TM Reader prior to unplugging the USB cable. This can be done by right clicking the drive and selecting EJECT or via the USB icon in your task bar.

> ✳ When the TM Reader is restarted the deleted log names will automatically reappear but will have no tags reads in them until a tag is read.

Understanding the Front Panel of your Reader

V2 Reader

1 – Battery Voltage Indicator	2 – Power Button
3 – Auxiliary 12V Output	4 – Radio Antenna Connector
5 – External Power Socket	6 – Receive Loop Sockets
7 – Transmit Loop Sockets	8 – External Trigger Socket
9 – External Buzzer Socket	10 – RS232 Data Port

"11 – 3G Antenna Connection	"12 – TX Power Switch Low, Medium, High
13 – Reset Connector	14 – Relay Connector
15 – Clock Connector	16 – Inhibit Connector
17 – Inhibit Plug	"18 – SIM Card
19 – Router Indicators	20 – 3G Modem USB Socket
21 – Transmit Tune Button	22 – Radio Indicators
23 – SD Card	24 – Micro USB Socket
25 – Data Mode Switch	26 – Data USB Socket
27 – Receiver Status Indicators	28 – Tag Read Activity Indicators
29 – Ethernet RJ45 Socket	30 – Status LCD Display

V1 Reader

1 – Battery Voltage Indicator	2 – Power Button
3 – Radio Antenna Connector	4 – Auxiliary 12V Output
5 – External Power Socket	6 – Receive Loop Sockets
7 – Transmit Loop Sockets	8 – External Trigger Socket
9 – External Buzzer Socket	10 – RS232 Data Port
11 – Reset Connector	12 – Relay Connector
13 – Clock Connector	14 – Inhibit Connector
15 – Inhibit Plug	16 – Router Indicators
17 – 3G Modem USB Socket	18 – Radio Indicators
19 – SD Card	20 – Transmit Tune Button
21 – Micro USB Socket	22 – Data Mode Switch

23 – Data USB Socket	24 – Receiver Status Indicators
25 – Bluetooth Indicator	26 – Ethernet RJ45 Socket
27 – Status LCD Display	28 – Tag Read Activity Indicators

Battery Voltage Indicator

When you plug in and turn on your approved battery charger the battery will charge at 13.8 volts as indicated by the blue "Charging" LED. A red LED will indicate the level of charge. When the blue "Charging" LED extinguishes, the internal battery is fully charged at it's maximum of 12.5 volts.

Once charged, the battery voltage bar graph indicator shows the remaining battery charge level. As the reader is used and the battery drains, the battery voltage indicator will drop to a lower voltage reading. At about 11.0 volts, the low battery warning will sound and it is advised to plug in an external battery or power supply as soon as possible to keep the reader powered up. At about 10.8 volts, the reader will shutdown to prevent damage to the internal battery.

How long the reader's battery will last without charging will depend on how hard it is working. If you are using more features, the battery will discharge more quickly. A detailed explanation is provided in Battery Life

The reader must be stored with a fully charged battery. Please charge the reader immediately after using it. This will prolong it's life, saving you time and stress in the future! As a general rule if you use the reader for 4 hours the reader will require 4 hours to fully recharge.

Power Button

Press and hold the power button for 3 seconds to turn the reader on. The reader will emit a beep and the battery voltage indicator, status LCD display and some of the other indicators should light up.

Press and hold the power button for 3 seconds to turn the reader off.

Radio Antenna

If your reader is an XWR or XR then your reader has an in-built internal 900MHz antenna to enable peer-to-peer communications between your reader(s) and your computer. Wireless communication also requires a 900MHz USB Radio to be plugged into your computer.

Communication is at 115200 baud. The internal 900MHz antenna provides short range coverage. To extend coverage connect a 900MHz Antenna Connector or any make of high gain antenna to the Antenna connection on your reader.

To learn more about how to connect to your reader using radio and when you would use radio refer to "Streaming Live data from the reader".

> ❗ As with any wireless communication, 900MHz can be liable to interference from local "noise" factors. Always test the area where you will be operating your reader prior to timing an event. This will save you unnecessary stress on the day!

Auxiliary 12V Output

Used to power external 12 volt devices from the internal battery, such as Ethernet switches or routers. Do not exceed 1 Amp current. Using this output will drain more power from the battery and reduce the reader's run-time.

External Power Socket

Used to charge the internal battery, or provide power from an external battery. Please use only Trident approved chargers, power supplies and cables to prevent severe damage to the reader and to retain optimum tag read performance.

Non-compliant power supplies or generators cause "noise" which degrades read performance. This may cause missed tag (chip) reads and angry customers!

Receive Loop Sockets

This is where you plug in the 3-pin plug from the mats. For single mat usage, you can use either RX1 or RX2 socket but for the sake of clarity start with the RX1 socket (and the TX1 socket for the corresponding mat's transmit cable). You can safely plug in or unplug mats while the reader is running.

> ❗ IMPORTANT! When you insert the mat plug into this socket it gets locked in place. To remove the mat plug, you must first hold down the unlock lever on the side of the socket, then gently pull the mat plug out of the socket.

Transmit Loop Sockets

This is where you plug in the 5-pin plug from the mats. For single mat usage, you can use either TX1 or TX2 socket but for the sake of clarity start with the TX1 socket (and the matching RX1 socket for the corresponding mat's receive cable). You can safely plug in or unplug mats while the reader is running.

> **!** When you insert the mat plug into this socket it gets locked in place. To remove the mat plug, you must first hold down the unlock lever on the side of the socket, then gently pull the mat plug out of the socket.

Trigger Socket

Plug in the optional external trigger to place a time-stamp record into the tag logging files. This is useful for manually time-stamping gun starts so that your timing software can remove or ignore all reads prior to this time-stamp record.

Buzzer and Buzzer Socket

Plug in the optional external buzzer so that tag reads can be heard over high background noise. Helps create that good feeling at the finish line.

Beeps when turning the unit on

- 1 single beep – everything is OK
- 3 very short beeps – wrong firmware loaded on board: please load new firmware
- 5 very short beeps – clock is not set correctly. Use Tiny Score to sync the clock. If it keeps happening, check and replace the clock battery.
- 10 beeps over 10 seconds – SD card failed, SD card LED will be red, and a warning will be shown on the LCD screen.

After startup or when the tune button is pressed, or when a mat is plugged in

- 1 beep when each TX starts tuning, a double beep when all TX tuning finishes. Eg. 4 mats plugged in, tune will give 4 single beeps followed by a double beep when finished.

Beeps when unit is running

- 1 short beep on trigger
- 1 beep on change of inhibit (link inserted or inhibit button pressed)
- 1 second beep when the reader asks for confirmation of time change (when a new time is available from GPS or SNTP – does not apply if p65=-1)
- 1.5 second beep every minute while inhibited (tags are not read while inhibited)
- 1 second beep every 30 seconds while in USB mass storage mode (tags are not read while in USB mass storage mode)
- 1 short beep when UHF scanning starts

- short beeps on tag (depends on beep setting, All tags, first seen, best seen, etc)

- If SD card fails while the reader is running, you will hear a double beep every 5 seconds, the SD card LED will be red, and you will see a warning on the LCD screen.

RS232 Data Port

This is for us technical guys to use only. Its how we charge the flux capacitor switch.

Reset Connector

Just like any Computer, in **rare** circumstances, you may need to reset your reader.

The reset connector has two functions as follows:

1. Soft Reset: Allows you to perform a quick reset of the reader system to a state just after the reader is turned on. Apply a momentary short circuit to the reset connector pins. The reader will immediately reset.
2. Hard Reset: Allows a power-reset of the reader as if it had just been powered off and back on using the power button. Apply a short circuit (by placing a piece of metal across the pins) to the reset connector pins for 20 seconds. The reader will emit a constant tone during this time to warn of the upcoming power reset. After 20 seconds the reader will perform a complete power off for 3 seconds, then power itself on again. Remove the short from the reset connector.

! If you use this function, please note that it will disconnect any network connections to the reader over Ethernet or Wi-Fi so you will need to reconnect your timing software.

Relay Connector

Provides connections for normally open & normally closed relay contacts that can be activated when a tag is seen. The relay contacts can be used to activate an external horn, light, camera etc. By default this functionality is turned off in the config.ini file. Please see the "Activate Relay On Tag Read" section of the config.ini file parameters to enable.

Clock Connector

Allows for connection of an external clock display or the optional Trident Sports Timing Clock. This clock can either display the current time, or be used as a stopwatch to show competitors the elapsed time. The clock is controlled by using pass through commands to the reader's control port, as described later in this manual.

✳ NB: Programmers, before sending the clock any configuration commands, you must send an "Attention" command which is a carriage return, followed by the usual carriage return & line feed. E.g. $PT_CMD,CLK,

A brief description of the clock pass through commands are:

Attention
Description: Get the clock's attention, put it into command mode.
Syntax: $PT_CMD,CLK,

Zero The Clock
Description: Zero's the clock so it displays 00:0000. This also automatically stops the clock.
Syntax: $PT_CMD,CLK,z

Start The Clock
Description: Sends the clock a "go" command so it starts timing
Syntax: $PT_CMD,CLK,g

Stop The Clock

Description: Sends the clock a "stop" command so it stops timing

Syntax: $PT_CMD,CLK,s

Set The Clock's Absolute Time

Description: Set the absolute time on the clock. This also automatically starts the clock. Used when you want to set the time of the clock, and are not using GPS locked time with timezone offset

Syntax: $PT_CMD,CLK,aHHMMSS

Inhibit Connector and Plug

> **!** Warning: If the inhibit plug is plugged in to this connector you will not be able to read Shoetag, Bibtags or Ankletags!! (i.e. non-powered tags, battery powered tags will always be able to be read).

Used to disable the mat transmit circuitry of the reader system to reduce power consumption and therefore extend the reader's run-time from the internal battery . When the Inhibit function is active, the message "ALL TRANSMIT INHIBITED" is displayed on the LCD screen See Figure 3. This connector is normally left EMPTY. See Figure 1 below – this shows when TX is enabled.

When the Inhibit plug is IN , the transmit power is OFF, see Figure 2 below – this shows when TX Inhibited.

Inhibiting the reader is useful in either of these two circumstances:

- When using self-powered "active" tags you do not need to use the mat transmit functions of the reader system.
- Once the reader has been fully configured and tested just prior to timing an event, you can insert the "Inhibit Plug" to turn off the mat transmit circuitry, which in turn lowers battery drain while you wait for the event to start. BUT DON'T FORGET TO PULL IT OUT WHEN YOU START TIMING!!
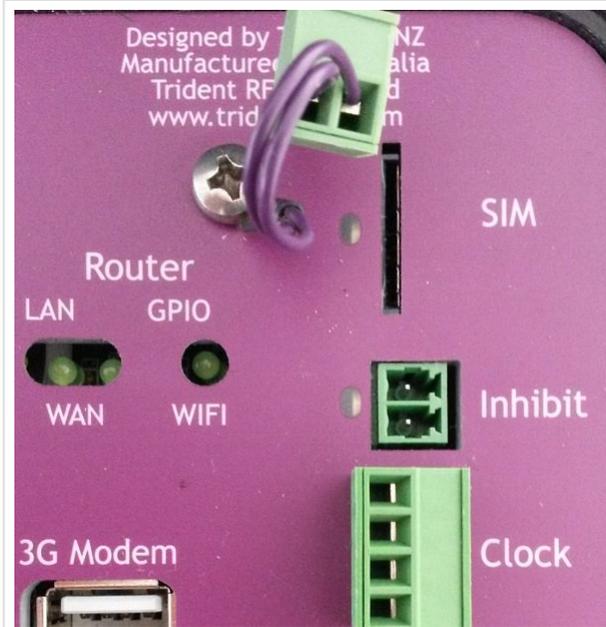
Fig 1. TX Enabled (Will Transmit)

Fig 2. TX Inhibited (Will Not Transmit)

Fig 3. Screen Display When Transmit is Inibited (Plug In)

Router Indicators and WIFI

IF your reader model has an "X" after the name (i.e Club-XR or Pro-XWR) then the reader has extended router functions with DHCP (dynamic host configuration protocol) and WIFI.

The reader can assign an IP address to your timing computer if your computer's wireless network adapter is set to "Obtain An IP Address Automatically". If you cannot connect to the reader then your computer's network setting is not set to this setting. You can find out how to configure the computer's network settings to automatically connect under topic LINK.

These indicate status of the internal networking & router as follows:

- **LAN** Lit when a computer is connected to the Ethernet port, flashes during port activity
- **RDR/WAN** Lit when the reader has connected to the internal router, flashes during port activity
- **WiFi** 802.11 WiFi network is enabled, flashes during port activity

Your Trident reader has an internal WiFi network adapter and allows you to connect your timing computer to the reader over an 802.11b/g/n wireless network.

The wireless network name on the reader is customised for each customer prior to shipping and password is 12345678. Please refer Streaming Live Data from the Reader Via WiFi you wish to change your wireless network name and password, as well as advanced features of wireless networking.

3G Modem USB Socket

You can plug a Telco USB dongle into this socket so the reader can access the internet to send data to the Trident host server.

In order for data to be sent to the host server you must have the configuration settings in the config.ini file set correctly.

Radio Indicators and Reader Status Indicators

These indicate the status of the internal 900MHz peer-to-peer radio as follows:
ACT Flashes during port activity, i.e. A tag read has been sent
CONN Lights red when connected to a computer's 900MHz USB Radio, flashes during activity
PWR Lights red to indicate the reader has power
CPU Will pulse indicating radio CPU heartbeat. Blinks once per second if CPU is healthy.

Micro SD Card

> **!** IMPORTANT! It is critical to leave the card in the reader at all times DURING OPERATION so that the reader will function properly. The micro SD card should not be removed from the reader unless it is faulty, or for fault finding purposes. The reader will function without the micro SD card installed but will use default values that may not work for your configuration.

The micro SD storage card stores the reader configuration, log files and tag read data. IT IS NOT NECESSARY TO EJECT IT if you want to download data.

The micro SD card also stores a file called config.ini which contains customisable configuration settings for your reader. Please refer to the section entitled "CONFIGURATION OPTIONS" for more information on customising your reader's configuration. It is advised you don't modify this file unless you have a full understanding of what these configuration options actually do.

- 📄 ethernetBackup.log
- 📄 filtered.log
- 📄 raw.log
- 📄 status.log
- 📄 statusStaging.log
- ⚙ config.ini
- 📁 fullFiltered
- 📁 fullRaw
- 📁 fullStatus
- 📁 Factory Defaults
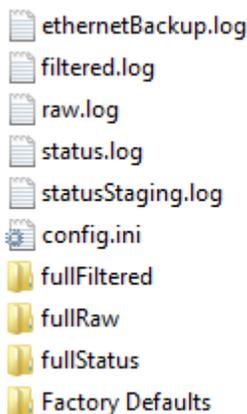
SD Card layout

The indicator just above the SD Card slot has three possible states:
RED/ORANGE Micro SD card not inserted or Problem with micro SD card. Try checking the SD card using a computer & USB card reader. Also check the format, see below.
GREEN Micro SD Card inserted correctly and is working OK

File system format

The reader supports SD cards formatted as **FAT** and also **FAT32**. Other formats are not supported. To check the format in Microsoft Windows, right click on the SD card drive and select properties. The format is listed next to "File System:" on the properties window.

> ❗ IMPORTANT! If you must remove the micro SD card ALWAYS do so with the reader power turned OFF. Failure to do this may corrupt or damage the micro SD card.

> ❗ IMPORTANT! When re-inserting the micro SD card do so in a vertical direction only. Inserting the micro SD card on an angle may cause the micro SD card to miss the internal micro SD-card slot and fall into the reader.

Transmit Tune Button

Adding or moving mats and/or cabling may cause the mat tuning to change. Press this button to manually tune the mats if you have added or moved a mat. A beep will be heard when tuning starts and two beeps heard when the tuning process has completed.

> ✳ Other devices and objects that are added to the area around your timing point can affect the tuning and performance of your mats, this can include temperature change, power supplies and metal barriers. It is good practice to tune your mats prior to competitors crossing the mats.

Micro USB Socket

You can access tag data and configuration files on the micro SD card by connecting your computer to the reader using the Micro USB cable. The computer will detect the reader's micro SD card as a "Removable Disk" and you can then use your timing software or Windows Explorer to download the required files directly from the reader. The tag read messages are logged to raw.log, and filtered.log, which contain the same data you would have seen if connected to the raw or filtered TCP/IP ports.

The micro SD card also stores a file called config.ini which contains customisable configuration settings for your reader. Please refer to Configuration Options for more information on customising your reader's configuration. It is advised you don't modify this file unless you have a full understanding of what these configuration options actually do.

While the micro USB socket is connected to your computer, the reader status display will read "Mass Storage Mode Active". When you unplug the USB cable, the reader will perform a complete restart (as if it was just powered on) to implement any possible configuration changes.

! IMPORTANT! The reader will NOT log tag reads while the micro-USB cable is plugged into your computer and the Data Mode Switch is set to Mass Storage. If you use this function while timing an event make sure that no athletes are going over the mats as they will not be timed!

Data Mode Switch

There are two separate modes:

1. Serial Communications Mode: When the switch is in the "UP" position the reader is able to send tag data out of the micro USB socket. **Use this mode when timing an event**
2. Mass Storage Mode: When the switch is in the "DOWN" position the reader is in mass storage mode meaning that the SD card can be recognised as an external drive as explained in detail in 21. Micro USB Socket. Use this mode when transferring data from your Micro-SD card to a PC.

✳ If the Data Mode Switch is either UP or DOWN and NO micro USB cable is physically inserted into the reader and connected to a computer, all data will STILL be captured to the SD card or ethernet ports etc.

! IMPORTANT! The reader will NOT log tag reads while the micro-USB cable is plugged into your computer and the Data Mode Switch is set to Mass Storage (Down). If you use this function while timing an event make sure that no athletes are going over the mats as they will not be timed!! Once the Micro USB has been safely removed from the connected Computer and the cable physically removed the reader will reboot. You will have to re-establish any connections to Timing Software and Finishlynx.

Data USB Socket

Not implemented yet, but this is intended for a USB Memory Stick so that data can be automatically copied from the MicroSD Card for easy portability. No cables, just plug it in and go.

Receiver Status Indicators

When a mat is plugged in to RX1 the RX1 indicator will flash once every second indicating that the connection is OK to the mat. The same applies for the RX2 connection. If an RX indicator does not flash, check the corresponding mat is plugged in securely or try another mat. The RX1 or RX2 indicator will flash rapidly while there are tag reads in progress.

Bluetooth Indicator

Not implemented yet as the firmware has not been completed and is scheduled for version 2. This will light up blue when Bluetooth is available.

Ethernet RJ45 Socket

The fastest and most reliable network communications is always through a cable. This also gives access to the most reader functionality. Connect your timing computer's Ethernet RJ45 socket to the reader's Ethernet RJ45 socket using a standard CAT-5 network cable. The router module can then automatically assign an IP address to your computer. The reader will be assigned the first IP address 192.168.0.101 and your computer will be assigned the next available IP address. eg. 192.168.0.102

> **!** IMPORTANT! The reader will assign an IP address to your timing computer. Ensure your computer's Ethernet network adapter is set to "Obtain An IP Address Automatically". This can be found in your PC's network settings.

Status LCD Display

This display cycles through various screens showing useful information about the reader's status and configuration as detailed below:

> **✳** If a tag is currently being read the status display will immediately switch to the Last Tag Information screen, and return to cycling through all information screens after approximately 10 seconds.

27.1. Network Settings

The Network Settings screen displays network configuration as follows:

READER NAME – The reader's configured name.

READER IP ADDRESS – The reader's assigned IP address. The default value for a new reader is 192.168.0.101 so configure your computer's timing software to connect to this IP address.

READER MAC ADDRESS – The reader's configured MAC (Media Access Card) address.

READER DATE & TIME – The reader's current date & time. Check this matches your timing computer's date & time. If they do not match you can synchronise via the TinyScore software which comes with your reader.

TAG READ COUNTER – A count of all tags read since the reader was restarted.

27.2. Logging Settings
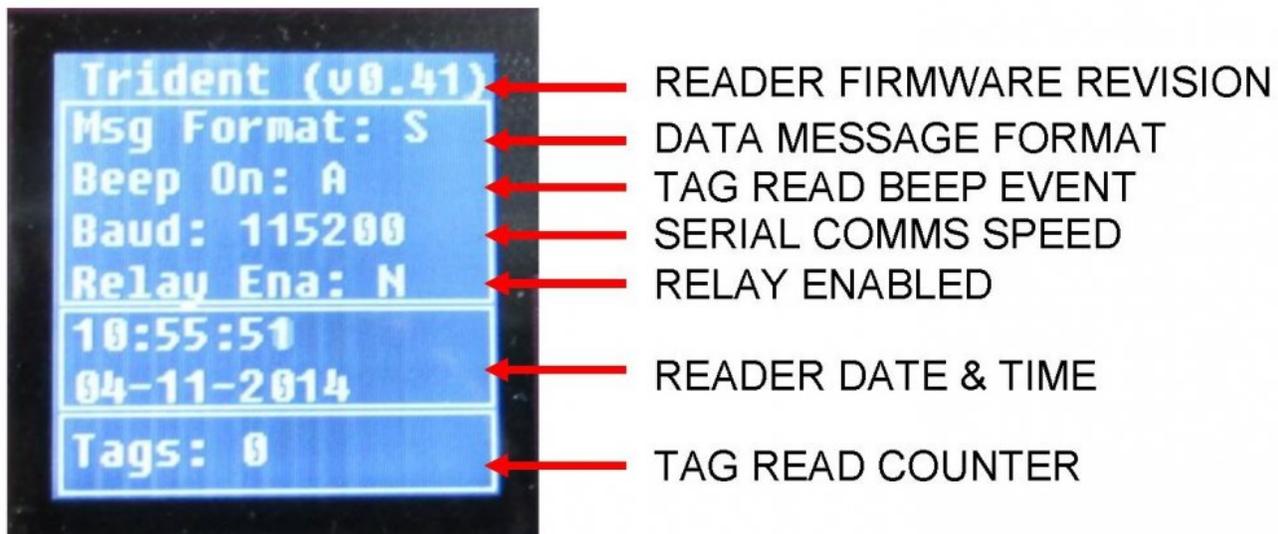
The Logging Settings screen displays tag read options as follows:

READER FIRMWARE REVISION – The version of the reader's internal Trident firmware.

DATA MESSAGE FORMAT – Message format used to communicate with the reader. Most timing software will use the "Standard" data message format. Settings are: S=Standard data message format, R=Reduced data message format, C=Chinese data message format.

TAG READ BEEP EVENT – Setting to determine whether the reader will emit a beep when a tag is read. Settings are: A=Beep on all tags, F=Beep on tag first seen, N=No beep.

SERIAL COMMS SPEED – This is the 900MHz Radio serial output baud rate. If you are using a 900MHz USB Radio on your timing computer, configure the timing software to communicate with the appropriate serial port at this speed.

RELAY ENABLED – Displays whether the tag read relay output has been enabled, N=No, Y=Yes . Can be used for events such as starting a video or initiating a camera shutter.

READER DATE & TIME – The reader's current date & time. Check this matches your timing computer's date & time. If they do not match you can synchronise via the TinyScore software which comes with your reader.

TAG READ COUNTER – A count of all tags read since the reader was restarted.

27.3. Data Port Settings
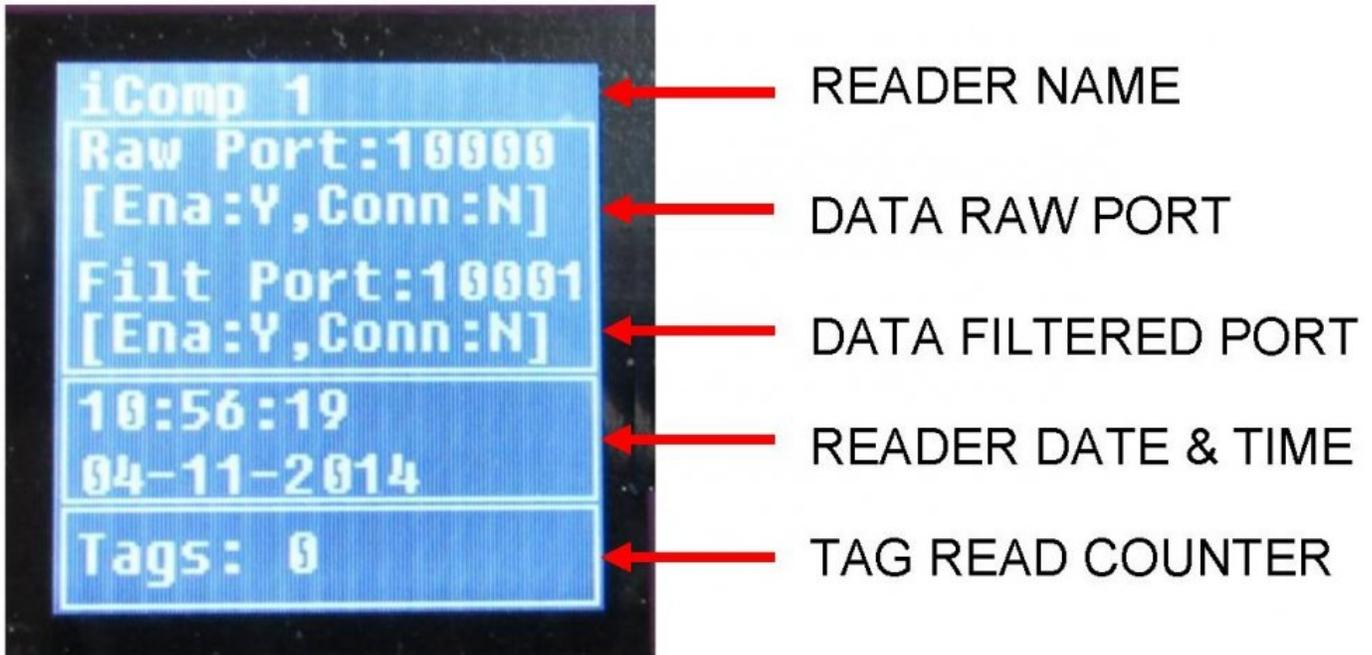
This screen displays the reader's tag data port settings and status as follows:

READER NAME – The reader's configured name.

DATA RAW PORT – The reader's RAW logging TCP/IP port which sends a message about every tag that is detected, even repeated detection's. If required, configure your timing software to connect to the reader's assigned IP address on this port. This is similar to legacy timing systems "RAW" port messages.

DATA FILTERED PORT – The reader's FILTERED logging TCP/IP port which sends a single First Seen, Best Seen, and Last Seen message for every tag that is detected. This significantly reduces the amount of logging data sent to your timing computer. If required, configure your timing software to connect to the reader's assigned IP address on this port. This is similar to legacy timing systems "FS-LS" port messages but includes Trident's "Best Seen" which provides a more accurate timing measurement.

READER DATE & TIME – The reader's current date & time. Check this matches your timing computer's date & time. If they do not match you can synchronise via the TinyScore software which comes with your reader.

TAG READ COUNTER – A count of all tags read since the reader was last restarted.

27.4. SD Card Information
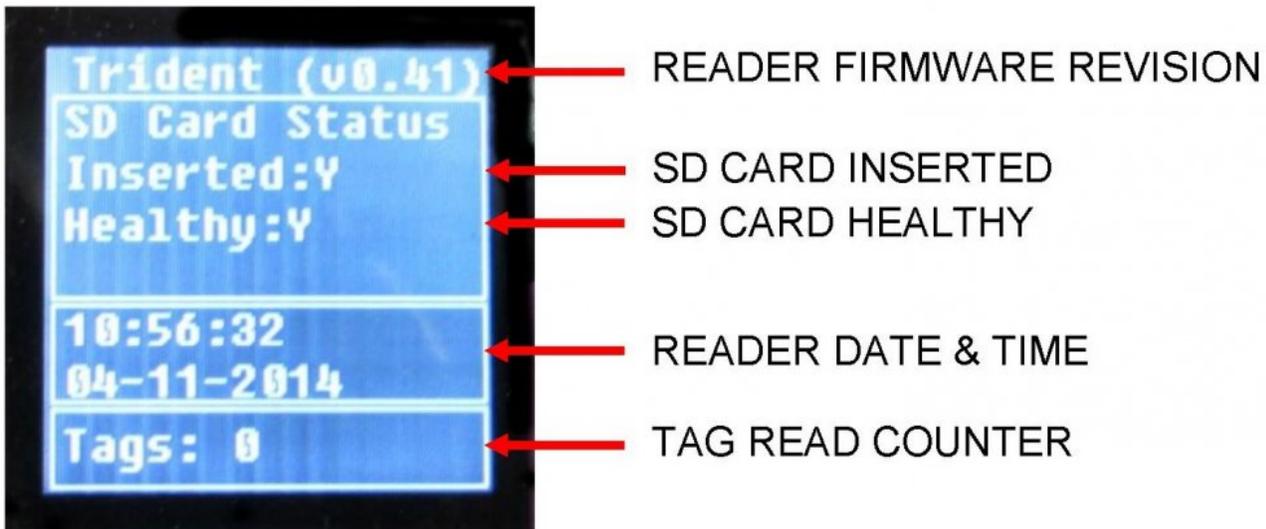
The SD Card Information screen displays the status of the micro SD card slot as follows:

READER FIRMWARE REVISION – The revision of the reader's internal Trident firmware.

SD CARD INSERTED – Indicates whether a micro SD card has been inserted. Y=Yes, N=No.

> ❗ IMPORTANT! Tag reads will NOT be logged to the micro SD card if it is not showing as correctly inserted.

SD CARD HEALTHY – Indicates whether the installed micro SD card is in a healthy, working state. Y=Yes, N=No.

> ❗ IMPORTANT! Tag reads will NOT be logged to the micro SD card if it is not showing as healthy.

READER DATE & TIME – The reader's current date & time. Check this matches your timing computer's date & time. If they do not match you can synchronise via the TinyScore software which comes with your reader.

TAG READ COUNTER – A count of all tags read since the reader was last restarted.

27.5. Control Port Settings
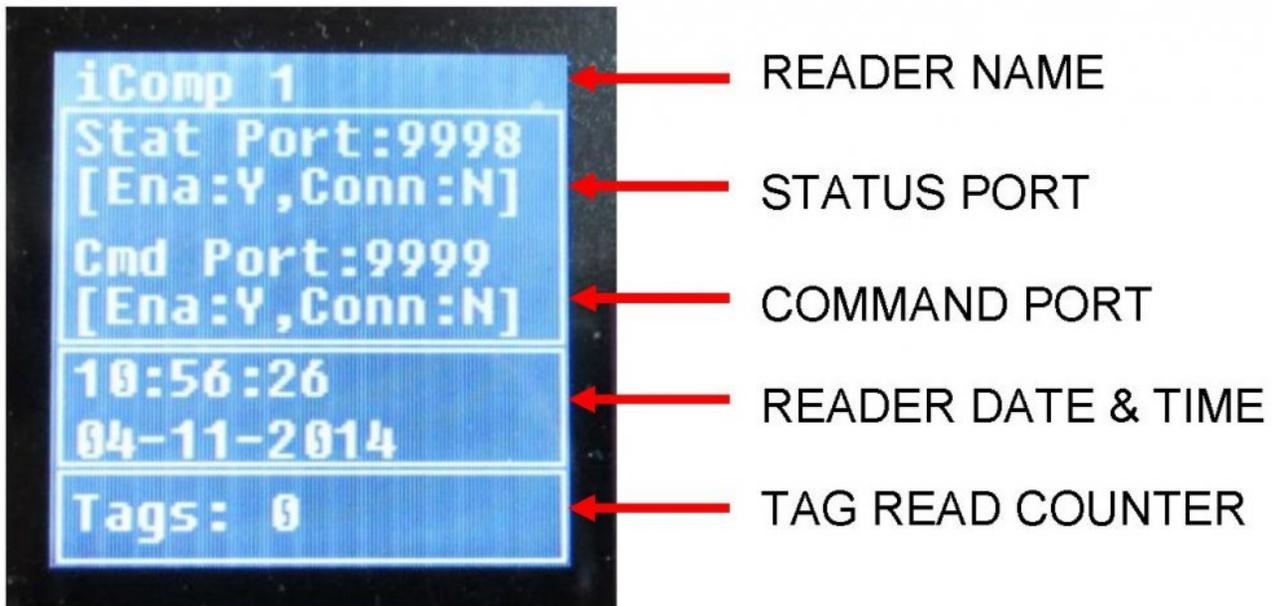
This screen displays the reader's control port settings and status as follows:

READER NAME – The reader's configured name.

STATUS PORT – Information about the reader's STATUS TCP/IP port which sends messages about the reader's status. If required, configure your timing software to connect to the reader's assigned IP address on this port.

COMMAND PORT – Information about the reader's COMMAND TCP/IP port. The command port allows configuration of the reader's settings eg. Setting the date & time. If required, configure your timing software to connect to the reader's assigned IP address on this port.

READER DATE & TIME – The reader's current date & time. Check this matches your timing computer's date & time. If they do not match you can synchronise via the TinyScore software which comes with your reader.

27.6. Transmit Status
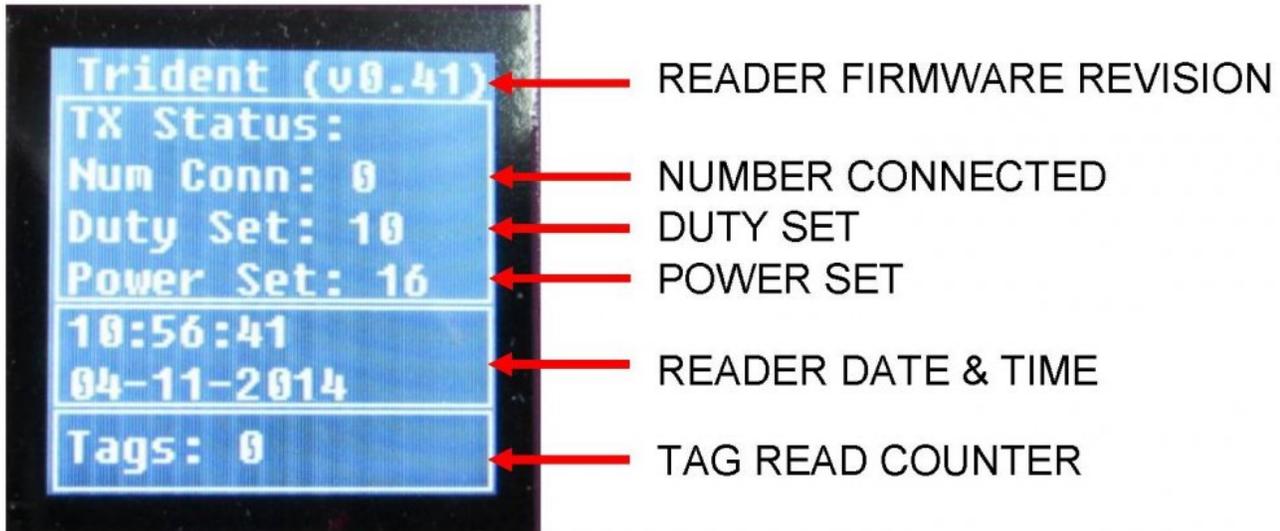
The Transmit Status screen displays connected transmit loops as follows:

READER FIRMWARE REVISION – The version of the reader's internal Trident firmware.

NUMBER CONNECTED – The number of connected transmit loops (mats). This corresponds to the number of mats plugged into the readers Transmit Loop sockets.

DUTY SET – Transmit duty cycle ON and OFF time, in milliseconds.

POWER SET – Transmit power setting (a value between 0 and 32).

READER DATE & TIME – The reader's current date & time. Check this matches your timing computer's date & time. If they do not match you can synchronise via the TinyScore software which comes with your reader.

TAG READ COUNTER – A count of all tags read since the reader was last restarted.

27.7. Transmit Tuning
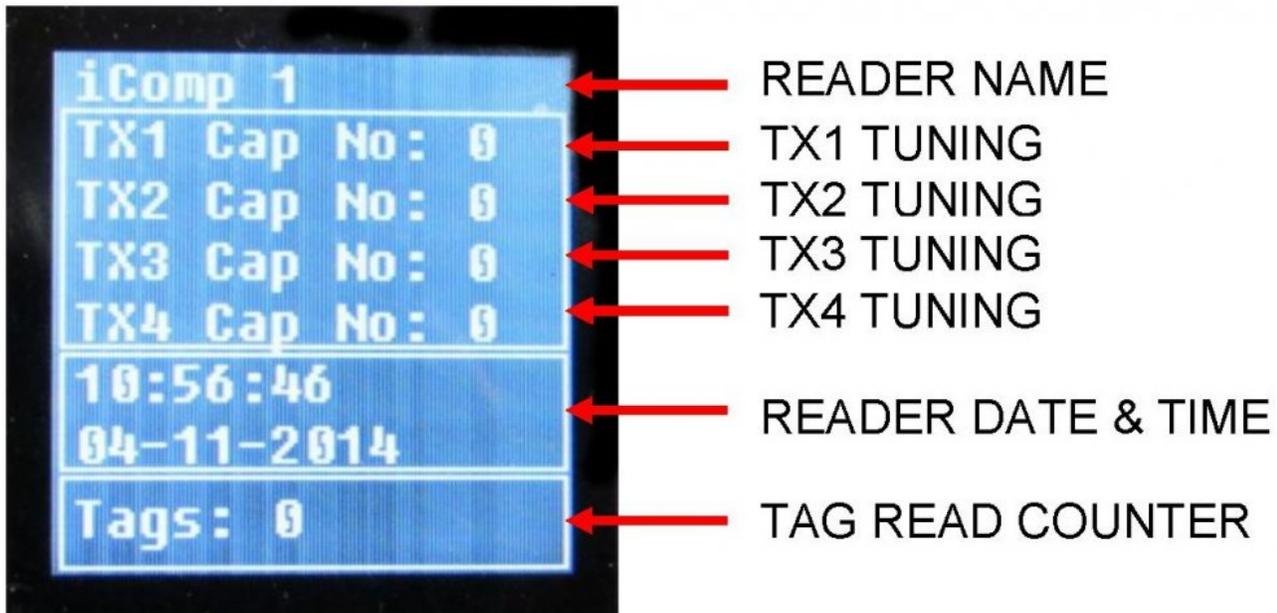
This screen displays the reader's mat transmit tuning results as follows:

READER NAME – The reader's configured name.

TX1 TUNING – TX1 loop tuning result.

TX2 TUNING – TX2 loop tuning result.

TX3 TUNING – TX3 loop tuning result.

TX4 TUNING – TX4 loop tuning result.

> **!** IMPORTANT! The tuning result for a connected transmit loop should be between 10 and 250. If it is outside this range try checking the mat cable connection to the reader, and press the reader's TUNE button. Try repositioning the mat on a flat surface away from sources of interference or metallic objects underneath the mat.

READER DATE & TIME – The reader's current date & time. Check this matches your timing computer's date & time. If they do not match you can synchronise via the TinyScore software which comes with your reader.

TAG READ COUNTER – A count of all tags read since the reader was last restarted.

27.8. Last Tag Information
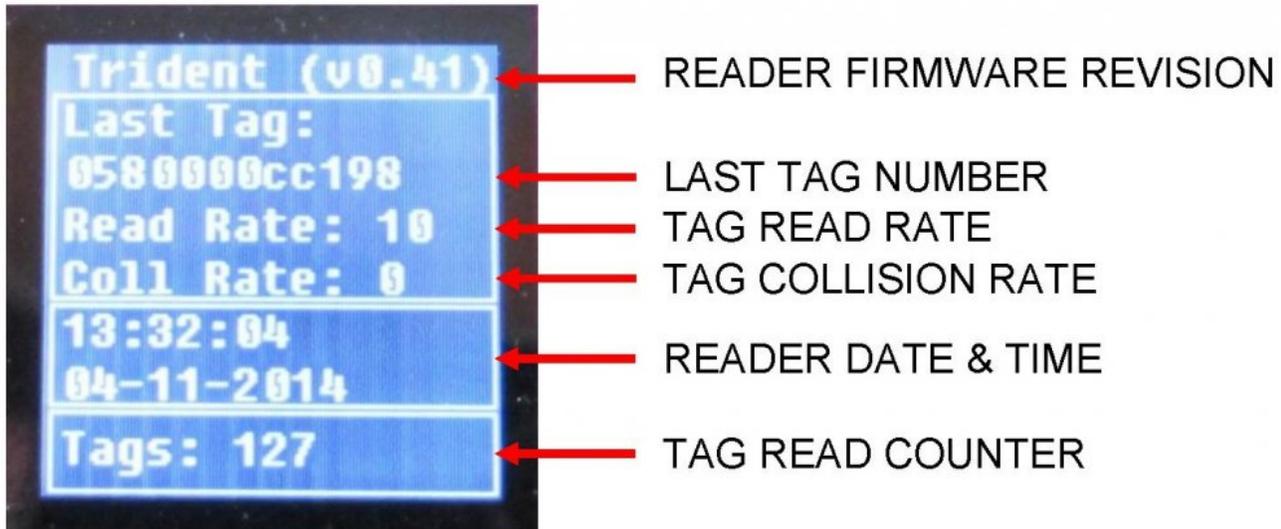
This screen displays information about tags that are currently being read. This screen stays visible while tags are being read, the status display will return to cycling through all screens if no tags are being read.

READER FIRMWARE REVISION – The revision of the reader's internal Trident firmware.

LAST TAG NUMBER – The revision of the reader's internal Trident firmware.

TAG READ RATE – The number of tags read per second.

TAG COLLISION RATE – The tag collision rate per second.

READER DATE & TIME – The reader's current date & time. Check this matches your timing computer's date & time. If they do not match you can synchronise via the TinyScore software which comes with your reader.

Tag Reader Activity Indicator

The tag read activity indicator will flash when a tag has been successfully read and logged. This is a useful indicator of successful tag reads during system setup and testing. This indicator will only flash once when a specific tag is first seen, and will flash again when the tag is detected after the tag first-seen/last-seen timeout.

Configuration Options

The Trident Time Machine reader is shipped with default configuration settings that will work for many event timing situations. You have the ability to customise the reader's settings by editing the file config.ini which is stored on the micro SD card. It is advised you don't modify this file unless you have a full understanding of what these configuration options actually do as some of the settings may reduce tag read reliability or prevent communications with the reader.

> ✳ You can find an up to date example of config.ini here
> **Example Config.ini**

> ❗ IMPORTANT! The micro SD card should not be removed from the reader unless it is faulty, or for fault finding purposes. It is critical to leave the card in the reader at all times so that the reader will function properly. The reader will function without the micro SD card installed but will use default values that may not work for your timing needs. If you HAVE to, ALWAYS insert/remove the micro SD card with the reader power turned OFF. Failure to do this may corrupt or damage the micro SD card.

Using the supplied micro USB cable, make sure the data switch is in the down position and connect the reader's micro-USB socket to your computer. While the reader's micro USB socket is connected to your computer, the reader status display will read "Mass Storage Mode Active". Wait a few seconds for Windows to detect the newly attached Removable Disk. When you unplug the micro USB cable, the reader will perform a complete restart (as if it was just powered on) to read in any possible configuration changes.

> ❗ IMPORTANT! The reader will NOT log tag reads while the micro-USB cable is plugged into your computer. Use the micro USB cable ONLY when you are not timing an event.

All TM readers have a config.ini file stored on the SD card which allows parameters to be changed on the reader. These parameter's affect the way in which the TM reader sends data, communication protocols and power consumption.

> ❗ Prior to changing ANY settings make sure you read and UNDERSTAND the effects these changes will have on your TM reader.

Use Windows Explorer to browse the files on the detected Removable Disk, you are looking for a file called config.ini. This is a standard text file and can be edited with Notepad on Windows, or a similar program on Mac OS.

Configuration Parameters

The config file contains parameter settings, one per line.

Comments can be started with `//`, for example `// This is a comment`, and the reader will ignore that text until the next line. Also entire lines can be commented out, which would tell the reader to use the default setting, eg `//p00=Example` has no effect.

Since v0.108 of the reader firmware, the parameters can be named by their `p` number, like `p00` – or they can be named by name, like `System name` (names are not case sensitive).

The `p` numbers are the old way and are just left in for backwards compatibility.

If a parameter does not appear in config.ini, the default setting will be used. If a parameter appears more than once in config.ini, the last setting will be used.

It is also possible to adjust some settings while the system is in use. See Set Reader Parameter command for more details.

Some options have been removed from the system over time. If your config.ini contains these options (any options not listed below) then it is safe to leave them in the config.ini. If you are running the latest firmware update, then it also safe to delete them from config.ini.

Please see below for the list of configuration options. If a legacy `p` number is supported, it will be shown in brackets after the name.

- General configuration and identity
- Logging destinations
- Network setup
- Tag settings
- Trigger options
- Transmitter options
- HTTP Post setup
- UHF options
- Router options

General configuration and identity

✱ Please check your GPS settings in the config.ini file. **If you do not check these settings, the reader may automatically change time during the middle of a race!**

First, change the setting **p65** or **GPS autocorrect limit** to a small number like 0 or 60.
eg `p65=0`
or
`GPS autocorrect limit=0`
This setting limits how much the time can change automatically – without the reader asking you first. If you set it to 0 then the reader will always ask if it can change the time.
It does this by showing a message on the LCD, and then the Tune button (Setup button on UHF readers) can be used to move and select the highlighted menu item.

If you want to disable GPS entirely, put `//` in front of **p02** or **time zone offset**,
eg `//p02=...`
or
`//time zone offset=...`
(if running firmware v0.186 or above, you can also use
`p02=disabled`
or
`time zone offset=disabled`)
You can double check that the GPS is disabled by restarting the reader and checking the GPS LED on the faceplace. If this LED is turned off and not flashing, then GPS is disabled.

If you want to use GPS, then make sure the **p02** or **time zone offset** is set to your timezone. When GPS time is available the GPS LED will be lit constantly, and the reader will either ask if it can change the time or use the time automaically (depending on the **p65** or **GPS autocorrect limit** setting.

System Name (p00)

This setting is used for the following:
- Network hostname/NETBIOS name (MS Windows can find the reader using this system name rather than IP address)
- Displayed on the top line of the LCD (the top line is shared with System name, Company name and firmware version).
Format: Any string up to 29 characters in length.
Default: `TimeMachine`

Can be set at any time.

Example: `System name=Start line`

Company name (p29)

This setting is used for the following:

- Displayed on the top line of the LCD (the top line is shared with System name, Company name and firmware version).

Format: Any string up to 29 characters in length.

Default: `Trident`

Can be set at any time.

Example: `Company name=Contoso`

Reader ID (p30)

A single alphanumeric character `A-Z, a-z, 0-9` which identifies the reader in multi-reader setups.

This ID character is inserted as the 3rd character in the raw and filtered logs and also in the IPICO style trigger messages.

Format: A single uppercase or lowercase character from `A-Z, a-z` or digit from `0-9`

Default: `a`

Can be set at any time.

Example: `Reader ID=Z`

Time zone offset (p02)

If your reader has GPS function, this setting is used to calculate local time from GPS time.

This setting is also used to convert SNTP (network time) to local time.

Note: automatic daylight savings is not supported, so if your area observes daylight savings, this parameter should be adjusted at the start and end of the daylight savings period.

Format: Timezone specifier like `-9:30, +07:00`, etc. If the sign (`+`, `-`) is not given, `+` is assumed. Minutes are optional, so a value of `6` equates to `+06:00`.

Default: **Not set – GPS or SNTP will not function until this is set to a valid value**

Can be set in config.ini only.

Example: `Time zone offset=+10:00 // Set timezone for Brisbane, Australia.`

To disable GPS and SNTP functionality, set this parameter to `disabled` eg: `Time zone offset=disabled`

SNTP server

Specify the SNTP server to use to get time updates over the internet.

In order for this to work, your reader will need to have internet access via properly configured ethernet network or built in 3G connectivity.

Format: URL of SNTP server

Default: blank

Can be set in config.ini only.

Example: `SNTP server=0.pool.ntp.org // Try to get time updates from global NTP server`

GPS autocorrect limit (p65)

Maximum limit (in seconds) for automatic GPS clock adjustment (note, this parameter is also used for automatic SNTP adjustment).

When the GPS lock or SNTP time is received, it will be applied automatically if the time difference is smaller than this limit.

If the time difference is larger, then a prompt will be shown on the LCD asking if the clock should be adjusted to the new time.

Format: Number of seconds from `-1` to `2147483647`. `-1` will never show the prompt (always automatically adjust the clock). `0` will always show the prompt (never automatically adjust the clock). A value of eg. `60` will adjust the clock automatically if the time difference is less than one minute, otherwise will display a prompt.

Default: `60`

Can be set in config.ini only.

Example: `GPS autocorrect limit=-1 // Always use GPS or SNTP time as soon as it is available, never show a prompt`

Name log files by date

A True/False setting which controls the naming of raw.log, filtered.log, and status.log.

When set to true, the log files are named as raw_YYYYMMDD.log, filtered_YYYYMMDD.log, and status_YYYYMMDD.log.

Format: `T` for true or `F` for false.

Default: `F`

Can be set in config.ini only.

Example: `Name log files by date=T`

Delete log files after N days

If `Name log files by date` is set to true, this parameter can be set to delete old log files after a certain number of days.

A setting of 1 will delete log files after they are 1 day old (in other words, they have not been written to for 1 whole day).

Format: Number of days after which to delete old log files from `0` to `255`.

Default: `0` – do not delete old log files

Can be set in config.ini only.

Example: `Delete log files after N days=30`

Read rate time constant

This parameter controls how the read rate is filtered on the LCD.

If time constant is set to zero (default) then the LCD will just display how many tags were read in the preceding second, with no filtering.

If the time constant is 1 or more, a low pass filter is used with a time constant of approximately that many seconds.

Eg 1 is not much filtering, 10 is a reasonable amount, 100 would take a very long time to change, would only be useful for static testing.

This parameter is mainly for testing purposes.

Format: Number of seconds for read rate filter

Default: `0` – no filtering

Can be set at any time.

Example: `Read rate time constant=10 // Filter the read rate displayed on the LCD`

Log statistics (p27)

A True/False setting which controls whether the reader logs technical statistics to its status.log file. The statistics can be useful for debugging any issues with the reader.

Format: `T` for true or `F` for false.

Default: `F`

Can be set at any time.

Example: `Log statistics=T`

Verbose debug (p40)

A True/False setting which enables or disables extra debugging information to be logged to status.log.

For example, setting this to true will result in (a lot of) GPS information being logged.

Format: `T` for true, `F` for false

Default: F

Can be set at any time.

Example: `Verbose debug=T`

Logging destinations

Log raw to SD (p08)

A True/False setting which controls whether to write raw tag reads to the raw.log file on the SD card.

Format: `T` for true or `F` for false.

Default: `T`

Can be set at any time.

Example: `Log raw to SD=T`

Note: we recommend you always leave this set to true, so you do not need to put this line in your config.ini, you can just leave it set to the default.

Log filtered to SD (p09)

A True/False setting which controls whether to write filtered tag records to the filtered.log file on the SD card.

Format: `T` for true or `F` for false.

Default: `T`

Can be set at any time.

Example: `Log filtered to SD=T`

Note: we recommend you always leave this set to true, so you do not need to put this line in your config.ini, you can just leave it set to the default.

Log raw to ethernet (p10)

A True/False setting which controls whether to allow raw tag reads to be read from the raw logging port.

Format: `T` for true or `F` for false.

Default: `T`

Can be set at any time.

Example: `Log raw to ethernet=T`

Note: we recommend you always leave this set to true, so you do not need to put this line in your config.ini, you can just leave it set to the default.

Log filtered to ethernet (p11)

A True/False setting which controls whether to allow filtered tag reads to be read from the filtered logging port.

Format: `T` for true or `F` for false.

Default: `T`

Can be set at any time.

Example: `Log filtered to ethernet=T`

Note: we recommend you always leave this set to true, so you do not need to put this line in your config.ini, you can just leave it set to the default.

Log filtered to serial (p12)

A True/False setting which controls whether to output filtered tag records on the serial port. In PRO 'R','XR','XWR' readers, there is an internal radio connected to the serial port

Format: `T` for true or `F` for false.

Default: `F`

Can be set at any time.

Example: `Log filtered to serial=T`

Log raw to USB (p38)

A True/False setting which controls whether the reader sends raw reads to the USB com port (if connected and the switch is in the "Data" mode).

Format: `T` for true or `F` for false.

Default: `F`

Can be set at any time.

Example: `Log raw to USB=T`

Log filtered to USB (p37)

A True/False setting which controls whether the reader sends filtered reads to the USB com port (if connected and the switch is in the "Data" mode).

Format: `T` for true or `F` for false.

Default: `F`

Can be set at any time.

Example: `Log filtered to USB=T`

Serial output baudrate (p14)

Controls the baudrate of the reader's serial port.

If using the internal radio of a PRO 'R','XR' or 'XWR' then this should be left as default.

Format: One of the values `300, 1200, 2400, 4800, 9600, 14400, 19200, 28800, 38400, 57600, 115200, 230400`

Default: `115200`

Can be set in config.ini only.

Example: `Serial output baudrate=115200`

Network setup

Local IP address (p04)

Used to set the LAN IP address for the reader. **Note: Pro 'X', 'XR', 'XW', and 'XWR' readers also contain an in built network router, which uses a completely separate IP address, see Router information**.

Format: IP address like `192.168.0.101`

Default: `0.0.0.0` – The reader will attempt to get IP address via DHCP.

Can be set in config.ini only.

Example: `Local IP address=192.168.0.101`

Ethernet gateway (p34)

IP address of the LAN gateway. The gateway is the router on the LAN which connects the LAN to the internet.

Format: IP address like `192.168.0.1`

Default: `192.168.0.1` (Note this default only takes effect if the `Local IP address` is configured, otherwise DHCP will be used to set the gateway address.)

Can be set in config.ini only.

Example: `Ethernet gateway=192.168.0.1`

Ethernet subnet mask (p35)

IP Subnet mask for the LAN.

Format: Submask like `255.255.255.0`

Default: `255.255.255.0` (Note this default only takes effect if the `Local IP address` is configured, otherwise DHCP will be used to set the subnet mask.)

Can be set in config.ini only.

Example: `Ethernet subnet mask=255.255.255.0`

DNS server primary

IP address of primary DNS server, used to resolve domain names into IP addresses.

Format: IP address

Default: If unset, uses ethernet gateway

Can be set in config.ini only.

Example: `DNS server primary=208.67.222.222 // Use openDNS primary server`

DNS server secondary

IP address of secondary (backup) DNS server, used to resolve domain names into IP addresses if the primary server does not work.

Format: IP address

Default: `8.8.8.8` – Google DNS server, may be blocked in some countries.

Can be set in config.ini only.

Example: `DNS server secondary=208.67.220.220 // Use openDNS secondary server`

FTP username (p60)

Username for the FTP server.

Format: username string

Default: `anonymous`

Can be set at any time.

Example: `FTP username=admin // change FTP username to admin`

FTP password (p61)

Password to use for the FTP server.

Note: If the username is default or set to `anonymous`, this paramter is completely ignored and any password is accepted.

Format: password string

Default: blank

Can be set at any time.

Example: `FTP password=psswrd // change FTP password to psswrd`

Status logging port (p18)

Used to change the TCP port number where the status messages can be accessed.

Format: number from 1 to 65535

Default: `9998`

Can be set in config.ini only.

Example: `Status logging port=9998`

Command port (p19)

Used to change the TCP port number where command messages can be sent.

Format: number from 1 to 65535

Default: `9999`

Can be set in config.ini only.

Example: `Command port=9999`

Raw logging port (p05)

Used to change the TCP port number where the raw tag reads can be accessed.

Format: number from 1 to 65535

Default: `10000`

Can be set in config.ini only.

Example: `Raw logging port=10000`

Filtered logging port (p17)

Used to change the TCP port number where the filtered tag records can be accessed.

Format: number from 1 to 65535

Default: `10001`

Can be set in config.ini only.

Example: `Filtered logging port=10001`

Router options (for units with X in the product name)

Disable router config (p48)

A True/False setting which can be used to disable the router configuration.

If the TimeMachine model has an X in the name, then the TimeMachine has a separate network router inside the time machine.

From factory setup, this router is on IP address 192.168.0.1 and will serve DHCP requests, meaning that it will assign a network address to eg. a laptop which is plugged into the TimeMachine.

By default, the router can be configured automatically by the TimeMachine, so that its settings match what is in config.ini.

If you have a complex network setup then you may need to set this parameter to `T` in order to make sure the TimeMachine doesn't overwrite any custom settings inside the router.

Format: `T` for true or `F` for false.

Default: `F`

Can be set in config.ini only.

Example: `Disable router config=T // Set to T to ignore all router settings in config.ini`

Note: if either the reader address or router address is changed from 192.168.0.###, then the reader may not be able to communicate with the router to configure it, and so the automatic configuration may have no effect in that case.

Router IP address (p49)

Used to set the LAN IP address for the router. **Note: this must be different to the "Local IP address" setting, which sets the IP address of the reader!**

Format: IP address like `192.168.0.1`

Default: `192.168.0.1`

Can be set in config.ini only.

Example: `Router IP address=192.168.0.5 // Move the router IP address, possibly because something else on your network is on 192.168.0.1`

Router subnet mask (p50)

IP Subnet mask for the built in router.

Format: Submask like `255.255.255.0`

Default: `255.255.255.0`

Can be set in config.ini only.

Example: `Router subnet mask=255.255.255.0`

Router WIFI SSID (p51)

WIFI network name for the router.

The reader will show up in WIFI networks with this name.

Format: SSID string, up to 32 characters

Default: `Trident`

Can be set in config.ini only.

Example: `Router WIFI SSID=my-wifi-network`

Router WIFI Password (p52)

WIFI password for the router.

Format: WIFI password string, up to 64 characters

Default: `12345678`

Can be set in config.ini only.

Example: `Router WIFI Password=dzsrfilgkovpjbm`

Router DHCP start (p53)

Start of the pool of addresses which the router will assign to eg. a laptop which is connected to the TimeMachine.

To disable the DHCP server in the router, set this to 0.0.0.0

Format: IP address like `192.168.0.121`

Default: `192.168.0.121`

Can be set in config.ini only.

Example: `Router DHCP start=192.168.0.200 // start giving out addresses starting with 192.168.0.200`

Example: `Router DHCP start=0.0.0.0 // Disable the DHCP server in the router`

Tag settings

Tag timeout (p15)

Controls the timeout setting for filtered log records. If a particular tag is seen many times in a row, there must be a gap of at least this timeout between tag scans in order for the next tag scan to count as a separate filtered record.

For example, if the tag is read 20 times in 2 seconds, these 20 reads will all be counted as one filtered record if all scans were closer together than the timeout duration. The timeout is reset each time the tag is seen, so even if the tag is held on the mat for one minute it will still generate only one filtered record.

Format: Number of seconds from 1 to 65535

Default: `5`

Can be set at any time.

Example: `Tag timeout=5`

Activate relay on tag (p20)

A True/False setting which controls whether or not the reader will trigger the relay on each new tag. The relay is turned on whenever a First Seen filtered record is generated.

Format: `T` for true or `F` for false.

Default: `F`

Can be set at any time.

Example: `Activate relay on tag=T`

Beep on tag (p21)

Control when the reader beeps for tag scans.

Format: `F` for First seen, `A` for all tag scans, `N` for no tag scans, `B` for best seen (can only be used with virtual line method, see **Best seen method** below)

Default: `F`

Can be set at any time.

Example: `Beep on tag=F`

Additional tag prefixes (p36)

One or more additional tag prefixes to accept. By default the reader only accepts tags which begin with the characters `0580`, `0597`, or `0841`.

Format: One or more groups of 4 hex nibbles separated by commas like `0A00` or `0A00,1A1F`

Default: Empty

Can be set at any time.

Example: `Additional tag prefixes=0a00,0A10`

Filtered message types (p47)

The setting controls which types of filtered messages are written to filtered.log (and sent to filtered log destinations like ethernet etc).

Normally the reader ouputs FS, BS and LS messages.

This setting can be used to limit the message types which are logged.

Also, it can be used to remove the suffix, if third party timing software requires that (i.e. `FSNOSUFFIX` will log only FS messages but will not put the letters FS into the log records).

Format: One of the following strings: `ALL, FS, BS, LS, FSNOSUFFIX, BSNOSUFFIX, LSNOSUFFIX, FS,BS, BS,FS, FS,LS, LS,FS, BS,LS, LS,BS`

Default: `ALL`

Can be set at any time.

Example: `Filtered message types=FSNOSUFFIX`

Best seen method

Normally the best seen record is generated from the best RSSI seen during the tag timeout period. But this means that the best seen record will be generated at the same time as the last seen record, which is 5 seconds from the last time the tag has been seen, thus cannot be used with video timing etc.

With the virtual line method, a best seen record will be generated as soon as the tag reaches its highest read strength over the mat, thus can be used to trigger video timing systems. Also, when using virtual line method, the beep on tag setting can be set to best seen to generate a single beep per tag when it is right over the top of the mat.

Note: this setting is not supported on V1 readers. The normal method is always used on V1 readers.

Format: `N` for normal method, `V` for virtual line method.

Default: `N`

Can be set at any time.

Example: `Best seen method=V // Use virtual line method for best seen`

Trigger options

Trigger message type (p26)

Set the type of log record which is generated when the trigger is pressed.

Format:

`T` Trident type

`I` IPICO type – looks like `abA000001609280011093907000200`

`E` Extened type – like IPICO type but can have a description string appended to the end

Default: `I`

Example: `Trigger message type=I`

Trigger edge (p33)

A single character which controls which edge(s) of the trigger the reader should respond to.

Normally the trigger responds when it is first pressed (falling) but it can be setup to respond when released (rising) or on both edges (both).

Format: `F`alling, `R`ising, `B`oth

Default: `F`

Can be set at any time.

Example: `Trigger edge=F`

Trigger filter time

When zero, don't do any filtering of the trigger input.

When larger than zero, it is the number of centiseconds (1/100 of a second) to ignore the trigger event following the previous trigger event.

Format: Whole number from 0 to 4 billion

Default: `0` – no filtering

Can be set at any time.

Example: `Trigger filter time=50 // Ignore any trigger which happens less than 0.5 seconds following the previous trigger`

General transmitter settings

These settings apply to both UHF and DF readers.

TX power low (p62)

TX power setting, used when the power switch is set to "LO".
Note: this setting does not apply to V1 readers.
Format: Number from 1 to 32 for DF readers, 1 to 30 for UHF readers.
Default: `12` for DF system, `18` for UHF system.
Can be set at any time.
Example: `TX power low=20`

TX power (p23)

TX power setting, used when the power switch is set to "MED".
Note: this is the only power setting which applies to V1 readers. It is always used on V1 readers as they have no power switch.
Format: Number from 1 to 32 for DF readers, 1 to 30 for UHF readers.
Default: `18` for DF system, `24` for UHF system.
Can be set at any time.
Example: `TX power=24`

TX power high (p63)

TX power setting, used when the power switch is set to "HI".
Note: this setting does not apply to V1 readers.
Format: Number from 1 to 32 for DF readers, 1 to 30 for UHF readers.
Default: `32` for DF system, `30` for UHF system.
Can be set at any time.
Example: `TX power high=30`

TX power switch disable (p64)

This setting can be used to disable the transmit power switch.
If set to true, the only power setting that will be used is `TX power` (p23).
Format: `T` to disable the switch, or `F` to leave the switch enabled
Default: `F`
Can be set at any time.
Example: `TX power switch disable=T // Disable the power selection switch on the faceplate of the reader`

Inhibit input disable

This setting can be used to disable the inhibit input/button on the reader faceplate.

If set to true, the inhibit input and TX On/Off button will have no effect.

Format: `T` or `F`

Default: `F`

Can be set at any time.

Example: `Inhibit input disable=T // Disable the inhibit input and TX On/Off button`

DF Transmitter options

TX duty (p22)

Control the Mat transmitter duty cycle time. This setting controls how much power the transmitter mats use, as well as affecting the tag power-up distance (which can affect read range) and also affecting the receiver sensitivity (having the transmitters run constant duty will reduce read range). Good values seem to be 4:12 for low power usage, or 10:10 for better power-up distance but also double the power usage.

Note: A value of `1:0` means 100% duty cycle on the transmitters which is not recommended as it will seriously impact read range.

Format: `On:Off` where On is a number between 1 and 255 milliseconds, and Off is a number between 0 and 255 milliseconds.

Default: `10:10`

Can be set at any time.

Example: `TX duty=4:12`

TX timeslots enabled

Controls a setting in the Mat transmitters. When this parameter is false, the duty cycle of all mats is synchronised, so all mats are on at the same time and all mats are off at the same time. When set to true, each mat will turn on in sequence. Setting to true may help improve tag power-up in difficult environments (i.e. on reinforced concrete). If this parameter is true then the duty cycle should be set to 4:12 or another setting where the on time and off time are in a 1:3 ratio.

Format: `T` for true or `F` for false.

Default: `F`

Can be set at any time.

Example: `TX timeslots enabled=T`

UHF options

These options only apply to UHF, UHF8 and Hybrid systems, users of DF (dual frequency) systems can ignore these options.

UHF enabled (p54)

This setting tells the reader what kind of UHF reader it is.

Format: `T` or `F` or `4` or `8`. Must be set to `T` or `4` for UHF4 systems, `8` for UHF8 systems.

Default: `F` (for DF systems)

Can be set in config.ini only.

Example: `UHF enabled=4`

UHF active antennas (p56)

This controls which antenna ports should be active.

It is important to make sure that if a port is designated as active, an antenna should be plugged into it otherwise damage to the reader might occur.

If this is set to `auto` then pressing the "setup" button on the reader will scan and detect the antennas connected.

Format: `auto` for autodetect – this is recommended*. Otherwise a list of antennas separated by commas like `1,3,4`

Default: `auto`

Can be set at any time.

Example: `UHF active antennas=auto`

UHF append long ID (p57)

A true/false setting which controls the format of all tag messages (raw and filtered).

When set to true, two decimal digits are appended to the end of the record (which give the length of the full ID) and then the full length UHF ID is appended.

Normally the records only contain 48 bits of tag ID, and some UHF tags require longer IDs to be used.

Format: `T` for true, `F` for false

Default: `F`

Can be set at any time.

Example: `UHF append long ID=T`

UHF drop ID bytes (p58)

This setting can be used to drop a number of bytes from the end of a UHF tag.

Format: A number from `0` to `255`

Default: `0`

Can be set at any time.

Example: `UHF drop ID bytes=2 // Tag 0123456789ABCDEF becomes 0123456789AB`

UHF region

Set the region of the UHF reader to comply with local radio compliance laws.

Format: `China` or `Europe` or `USA` or `Korea` or `Japan` or `Australia`

Note: your trident reader will be optimised in hardware to work on ETSI (Europe frequencies) or FCC (USA frequencies).

If you have an ETSI reader, then you must set the region to Europe, or else it will not function correctly.

If you have an FCC style reader, then the region must be set to one of the countries other than Europe.

Default: Leaves setting unchanged. **It is highly recommended you set your region correctly**.

Can be set at any time.

Example: `UHF region=USA`

HTTP Post setup

These settings relate to the HTTP post feature of the trident reader.

If you are interested in using this, please contact your Trident reseller and ask for more information.

More technical details can be found here: Time Machine HTTP user manual

HTTP logging enabled (p16)

A True/False setting which controls whether or not the reader will attempt to post filtered.log to a HTTP server.

Format: `T` for true or `F` for false.

Default: `F`

Can be set in config.ini only.

Example: `HTTP logging enabled=T`

HTTP transport (p39)

This applies to HTTP post feature. When posting to a HTTP server, this setting specifies which network connection to use.

Format: `G` for 3G, `E` for ethernet. **Note: `G` setting applies only to the Pro-XWR or any other reader with W in its name. Otherwise the ethernet connection must be used for internet access**.

Default: `G`

Can be set in config.ini only.

Example: `HTTP transport=E`

HTTP connect string (p42)

This setting is the part of the URL which gives the address on the server of the webservice.

Format: URL part which is not the server name, like `/path/service.cgi?key=value`. Up to 49 characters long.

Default: blank

Can be set in config.ini only.

Example: `HTTP connect string=/splitdata.cgi?readerid=A // usually a key-value pair is given to identify the specific reader which is sending the records to the server.`

HTTP server address (p43)

This setting is the server address part of the URL (between `HTTP://` and the path on the server given by "HTTP connect string").

Format: a webserver address like `your.server.com` or an IP address like `192.168.0.234`. This can also contain a custom port number, if the web server is on port other than 80, like `your.server.com:8080` or `192.168.0.234:9234`.

Default: blank

Can be set on config.ini only.

Example: `HTTP server address=www.example.com`

Internet APN (p44)

This is exclusively for use with the built in 3G modem in the PRO XWR/PRO XW readers.

The APN depends on the 3G SIM carrier and generally can be found on your carrier's website or by google search.

Format: APN string, up to 29 characters long

Default: `internet`

Can be set on config.ini only.

Example: `Internet APN=live.vodafone.com`

Internet APN username (p45)

This is exclusively for use with the built in 3G modem in the PRO XWR/PRO XW readers.

Some 3G carriers require a username and/or password for the internet APN, but usually it is not required and these can be left blank.

Format: APN username string, up to 14 characters long

Default: blank

Can be set on config.ini only.

Example: `Internet APN username=<username from carrier>`

Internet APN password (p46)

This is exclusively for use with the built in 3G modem in the PRO XWR/PRO XW readers.

Some 3G carriers require a username and/or password for the internet APN, but usually it is not required and these can be left blank.

Format: APN password string, up to 14 characters long

Default: blank

Can be set on config.ini only.

Example: `Internet APN password=<password from carrier>`

Command Port Communications

The reader's command port allows you to query and set advanced reader configuration options from an Ethernet or Wi-Fi connected computer. The command port is accessed using the Telnet protocol and connecting to the reader's IP Address (default=192.168.0.101) and command port (default=port 9999).

The command port can also be accessed using the micro USB cable when the data switch is in data mode. Simply send the commands below to the com port and the reader will execute them in the same was as if they had been sent to the network command port.

Trident TinyScore can preform most tasks below.

It is recommended that command port commands should be sent programmatically from your sports timing software as manually typing the commands & parameters is very error prone.
All command port commands must be terminated with a `<CR><LF>` combination. The reader will respond with the appropriate response as detailed below. Malformed commands will be responded with "CMD UNHANDLED".

Below are the available command port commands:

SET DATE

Description: Set the reader date & time
Syntax: `$SETDATE:<date><CR><LF>`
   `<date>` is in the format YYMMDDHHMMSS, YY=Year, MM=Month, DD=Day, HH=Hours, MM=Minutes, SS=Seconds
Example: `$SETDATE:150831131700`
Response: `DATE:Mon Aug 31 2015 13:17:00`
Note: this command sets the time at the moment it is received. For best synchronization, the host which is going to send this command should ready the command for the next second, and then wait until the clock ticks over to that second and immediately send the command. Eg. if the host time is 13:45:23, ready a set date command to set the time to 13:45:24, and as soon as the host clock ticks over to 13:45:24 then send the command at that time.

GET DATE

Description: Retrieve the reader's current date & time
Syntax: `$GETDATE<CR><LF>`

Example: `$GETDATE`

Response: `DATE:Mon Aug 31 2015 13:17:00`

GET DATE V2 (since Firmware v0.140)

Description: Retrieve the reader's current date & time with milliseconds

Syntax: `$GETDATEV2<CR><LF>`

Example: `$GETDATEV2`

Response: `DATE:Mon Aug 31 2015 13:17:00.324`

CLEAR HISTORY

Description: Clear the reader's tag message history files

Syntax: `$CLEARHISTORY<CR><LF>`

Example: `$CLEARHISTORY`

Response: `HISTORY CLEARED`

INSERT MARKER

Description: Insert a timestamp and a text marker string into the Raw, Filtered and Status logs. This marker is not streamed via TCP ports.

Syntax: `$IM:<text><CR><LF>`

   `<text>` is the alphanumeric text message inserted into the logs

Example: `$IM:Race Now Started`

Response: `MARKER INSERTED`

TUNE REQUEST

Description: Tells the reader to tune all mats

Syntax: `$TUNENOW<CR><LF>`

Example: `$TUNENOW`

Response: `$TUNE COMMENCED`

PASSTHROUGH COMMAND

Description: Sends a command to another module inside or connected to the reader, currently the Transmitters (if attached), external clock (if attached), and power monitor can be targeted. For specific passthrough commands, please contact Trident.

Syntax: `$PT_CMD,<dst>,<command><CR><LF>`

<dst> Destination Device, can be TX1, TX2, TX3, TX4, CLK, PM

<command> Command to pass through to the device

Example: `$PT_CMD,TX3,$TXSTATUS`

Response: `PT_CMD – OK` or `PT_CMD - Failed, <reason>`

DELAYED PASSTHROUGH COMMAND

Description: Like the passthrough command but delay sending until a particular time.

Syntax: `$PT_CMD_DUE,<dst>,<date>,<command><CR><LF>`

<dst> Destination Device, can be TX1, TX2, TX3, TX4, CLK, PM

<command> Command to pass through to the device

<date> Date to send the message in YYMMDDHHMMSS

Example: `$PT_CMD_DUE,TX3,160926125500,$TXSTATUS`

Response: `PT_CMD – OK` or `PT_CMD - Failed, <reason>`

SET TRANSMITTER POWER

Description: Set the transmit power for the DF mats or the UHF antennas

Syntax: `$SETTXPOWER <power><CR><LF>`

<power> Number 1-32 for DF, 1-30 for UHF

Example: `$SETTXPOWER 21`

Response: `$SETTXPOWER power set to 21`

GET TRANSMITTER POWER

Description: Get the current transmit power for the DF mats or the UHF antennas

Syntax: `$GETTXPOWER<CR><LF>`

Example: `$GETTXPOWER`

Response: `$GETTXPOWER power set to 21`

GET READER PARAMETER

Description: Query the current setting of a reader parameter

Syntax: `$GETPARAM <param><CR><LF>`

<param> A parameter number like `P00` or parameter name like `System name`, see [configuration options](#)

Example: `$GETPARAM system name`

Response: `$GETPARAM system name=TimeMachine`

SET READER PARAMETER

Description: Temporarily set a reader parameter until next system reset.

Syntax: `$SETPARAM <param>=<value><CR><LF>`

   `<param>` A parameter number like `P00` or parameter name like `System name`, see [configuration options](#).

   `<value>` The value to assign to the parameter.

NOTE: Not all parameters support being set during run time, some can only be set via config.ini. Please see [configuration options](#) for more details.

Example: `$SETPARAM system name=START LINE!`

Response: `$SETPARAM system name=START LINE! OK` (or `$SETPARAM <param>=<value> <error message>`)

SOFT SYSTEM RESET

Description: Perform a software reset of the system. All parameters are reloaded from config.ini.

Syntax: `$RESET_S<CR><LF>`

Example: `$RESET_S`

Response: None.

HARD SYSTEM RESET

Description: Perform a hard power reset of the system. This is similar to the soft reset except that power is cycled to all components of the system (including mats).

Note: this command has no effect in custom installations where the mainboard is being used without the power monitor board.

Syntax: `$RESET_H<CR><LF>`

Example: `$RESET_H`

Response: `SYSTEM RESET IMMINENT - WATCHDOG DISABLED`

REPLAY FILTERED LOG FILE

Description: This command can be used in order to replay filtered.log to the network port (port 10001 by default).

Once the replay has finished, the reader transitions back to live filtered reporting automatically.

Syntax:

`$REPLAY<CR><LF>` – replay all available filtered.log

`$REPLAY <YYMMDDHHMMSS><CR><LF>` – replay from given date and time

`$REPLAY <HH:MM[:SS]><CR><LF>` – replay from given time within the last 24 hours, with optional

seconds

`$REPLAY stop<CR><LF>` – stop replay immediately

Note: When aborting replay using the `stop` command, any tags received since starting the replay (even though they have been written to filtered.log file) will not be sent out of the filtered port, so take care if you abort the replay that you don't miss out on tags. If tags were missed, use the replay command again to replay them.

Quick Guide on how to Time an Event

A pretty bold statement as a heading. In this section you will get a basic guide to timing a event with a TM Reader

Once you have familiarised yourself with the topics above and the reader setup, you will be ready to start timing an event.

> ✳ Please Note: When possible always use Ethernet cable as your first connection option.

As with any wireless communication, WiFi or Radio (900MHz) can be liable to interference from local "noise" factors. Always test the area where you will be operating your reader prior to timing an event. This will save you unnecessary stress on the day. Remember, a direct Ethernet connection is always the most reliable way of communication between your timing computer and your reader. I.e the fastest and most reliable network communications is always through a cable. If for some reason, you lose communication with your reader, do not Panic. You can always download the raw data from your reader. See section 8.3 on how to do this.

The following steps are a general guide to setup your reader ready to time an event:

- Ensure the reader is fully charged prior to setting it up at the event.

- We recommend you delete all old log files from the reader prior to every event.

- Unroll and place your mat(s) according to your site and event requirements using one of the configurations in Timing Mats. Plug the required mat cables into the reader's RX and TX sockets.

- Connect any optional accessories to the reader e.g. External Buzzer, External Trigger, Radio Antenna

- Power on the reader by holding down the power button for about 3 seconds. The battery voltage indicator and the Status Display will light up. The reader will perform its mat tuning procedure and emit two quick beeps when completed. You can also manually tune the antennas by pushing the Tune button on the reader.

- Ensure that the Data Mode Switch is in the "UP" position.

- Connect your timing computer to the reader via Ethernet or WiFi.

- Configure your timing software to communicate with the reader's IP address and either the RAW or FILTERED TCP port. (If required, plug the optional 900MHz USB Radio into your computer and configure your timing software to communicate with the detected COM port, and at the reader's serial baud rate).

- Set the TM Readers time

- Pass a test tag (use the tag type you are timing with) over the mat and look for an increase in the "Tags:" counter at the bottom of the reader's screen. A audible beep from the reader will be heard.

- Check that your timing software has also recorded the tag read.

- Proceed to time the event, ensuring from time to time that the reader has sufficient battery charge remaining.

- During the event timing, you can view the tag read results directly in your timing software (if you connected to the reader using the Ethernet, WiFi or 900MHz Radio connection).

- If necessary, once you have finished timing the event, you can download the complete tag read results files the reader.

- Turn the reader off by holding down the power button for 3 seconds. All indicators on the reader's front panel should go off.

> ❗ Always time an event on battery only. Generators and Power Supplies can create electrical "noise" which can have drastic effects on tag (chip) read rates. Make sure you understand what "noise" is. Pay close attention to your battery indicator and always have an auxiliary battery ready.

Tag Data Message Format

The Trident Time Machine sends only one type of tag data message. For data stream and logged via the FILTERED TCP/IP port the read type being FS (First Seen), LS(Last Seen) or BS(Best seen) is attached to the tag data message. The tag data message consists of 40 alphanumeric characters as detailed below:

SYMBOL	LEN	DESCRIPTION
aa	2	Prefix for all tag read data messages
R	1	Reader ID: Can be A to Z or a to z giving 52 possible reader ID's
1	1	Receiver ID: Corresponds to the receiver/mat that detected the tag. 1=RX1, 2=RX2 etc.
222222222222	12	Tag ID: The unique serial number programmed into each tag
3333	4	Contiguous Counter: The number of times this tag was read since the last tag timeout.
444444	6	Date: The date the tag was seen, in format YYMMDD
555555	6	Time: The time the tag was seen, in format HHMMSS
HH	2	Hundredths: Hexadecimal representation of the tag seen time hundredths of a second. eg. 10 represents 16/100 of a second, 63=99/100 of a second.
77	2	Padding characters, always 00
TT	2	Record Type: FS=FirstSeen, LS=LastSeen, BS=BestSeen, RR=RawRecord. Please note RR messages are not sent across the
SS	2	Signal Strength: Hexadecimal representation of the signal level received from the tag.

Extended Trigger Message

The extended trigger format allows for trigger events (pressing the Trigger) in the log to be tagged with a named event (short string).

This can be used for example to delineate the log files for certain events, so when the log is downloaded you can see the start time for a event.Example is:

5km

10km Run

10km Walk

The Trigger Message is then sent via Filtered Port as well as being stored in the filtered.log file.

In order to enable the features of extended trigger format yo need to make some changes to your config.ini and create a new events.ini file .

1. Connect up to your TM Reader via the mico USB cable and open up your config.ini file
2. Edit p26 to E (p26=E) this enables the extended trigger message format
3. Create new text document and name it **events.ini**
4. Enter the list of names (short strings), one per line. Each name is a maximum of 15 characters long and supports regular printable ASCII characters from char 20 (' ' space) to char 126 ('~' tilde)
5. Safely remove the mass storage device and restart the reader.

Setting the Event to be added to Trigger time stamp

In order to get a event from the event.ini file to be appended to the time stamp you need to select the event. When the reader is started, And the trigger is pressed a blank trigger message is generated (.e.g eabA00000220101000000541a000200 <- 15 spaces where the blank message is).

- To set the current event, hold down the tune button for 3+ seconds.
- You will see the LCD change from the normal information mode into an interactive menu mode.
- The event that will be set as the Current Event is the event displayed (highlighted) at the top of screen.
- To advance to the next event in the list momentarily press the "Tune Now" button. The list will move up with the current event at the top (the previous event moves up and is not visible on the screen). When the end of the file is reached the selection will go back to the first line of the file again.

Event.ini List Displayed - Current Event 5km | *Next Event Selected - Current Event 10 km*

- To advance by 10 entries, hold the tune button for 1 second.
- To go back to the top of the list, hold the tune button for 2 seconds.
- To exit menu mode, hold the tune button for 3 seconds. Note that even though the LCD will return to the top of the list, the current selected message is not changed.

Leaving Events Menu - Current Event shown is 5km

The message is shown for 3 seconds before returning to the normal LCD mode for confirmation.

Trouble Shooting

I keep losing connection to the Reader when connected via Wifi or ethernet.
The 3G WiFi router may have lost its settings. The on-board router needs to be in 3G Work Mode. **Login** to the Router via a browser and **check the Mode** the reader is configured to 3G Mode.

When I tried to do a Reader Firmware update I get errors like 'USB Bootloader Flash Contents Blank' and 'Error: Incorrect CRC' when I restart the reader.
Only Native Windows systems are supported for Firmware updates. Examples are XP, Win 7.x, Win 8.x, etc. Please repeat the firmware update using a standard Windows computer. Make sure that you cleanly eject the Trident BL drive when the update has been completed. Do not use computers that are running Windows under MacOS or Linux. They are not supported for this process.

Pre-event Checklist

Battery on Time Machine's Fully Charged

Time Machine's Labelled for each timing point

Time Machine's configured for each timing point

Mats Tested

Tags Prepared

Lunch and Water Packed (Not just for you but ALL your workers)

Post Event Checklist

All Tags (other than disposable) collected.

All gear packed away in vehicle or road crates (prior to going to the bar for a "we smashed it" celebration).

Mats – Cleaned, Dried and physically inspected. If any cabling looks suspect then test. It is good practice to test each mat prior to storage.

TM Reader – Charged. Log files backed up for event, Reader cleared of data.

Bill sent to Event.

Battery Life

HOW LONG SHOULD YOUR TIME MACHINE RUN FOR?

The Time Machine has been designed to give maximum performance versus battery life in a variety of event conditions.

> ✳ (Note that by saying "Battery Life" we mean how long with it run for each charge. As for how long will it last before it needs replacing? well that's about 4 years.)

Both Club and Pro readers use the same size battery. This battery has been selected as it is the largest capacity battery that is allowed by air transport authorities to be transported by aircraft as a single unit. The Club and the Pro readers use very little power to run thanks to their sophisticated and low power electronics. About 4 watts will be the norm.
The main power usage is done by the mats and is determined by the Power Setting. Of course less mats mean less power which is why the Club with only 2 mats runs almost twice as long as its big brother the Pro with 4 mats. The power setting can be adjusted by the user to suit the conditions of the day if required. This setting is factory set at 18 which in a Club will give around 7 hours battery life and about 4 hours in a Pro. The user can adjust the Power Setting from 1 to 32 although settings less than 5 would generally not be recommended.

- See your Manual for instructions on how to change the Power Setting.

The Power Setting is a little like the gas pedal in your car. Put your foot down and you will get heaps of power but the tank will soon be empty, Go a little easy and the tank will last longer. Same with the Power Setting. In most cases the factory setting is more than enough but we have given the user the ability to change it if need be. Bib tags in some harsh conditions (re enforced concrete) may require the power to be increased.
The attached graphs show a general indication of life span you can expect for each power setting and the power up range at these settings. Note that these tests were done in ideal conditions and may be slightly less in more harsh setups.
If you think you need high power for long periods you should consider adding a battery backup pack or one of our Battery /Chargers (when mains is available) to your system.

Figure 1
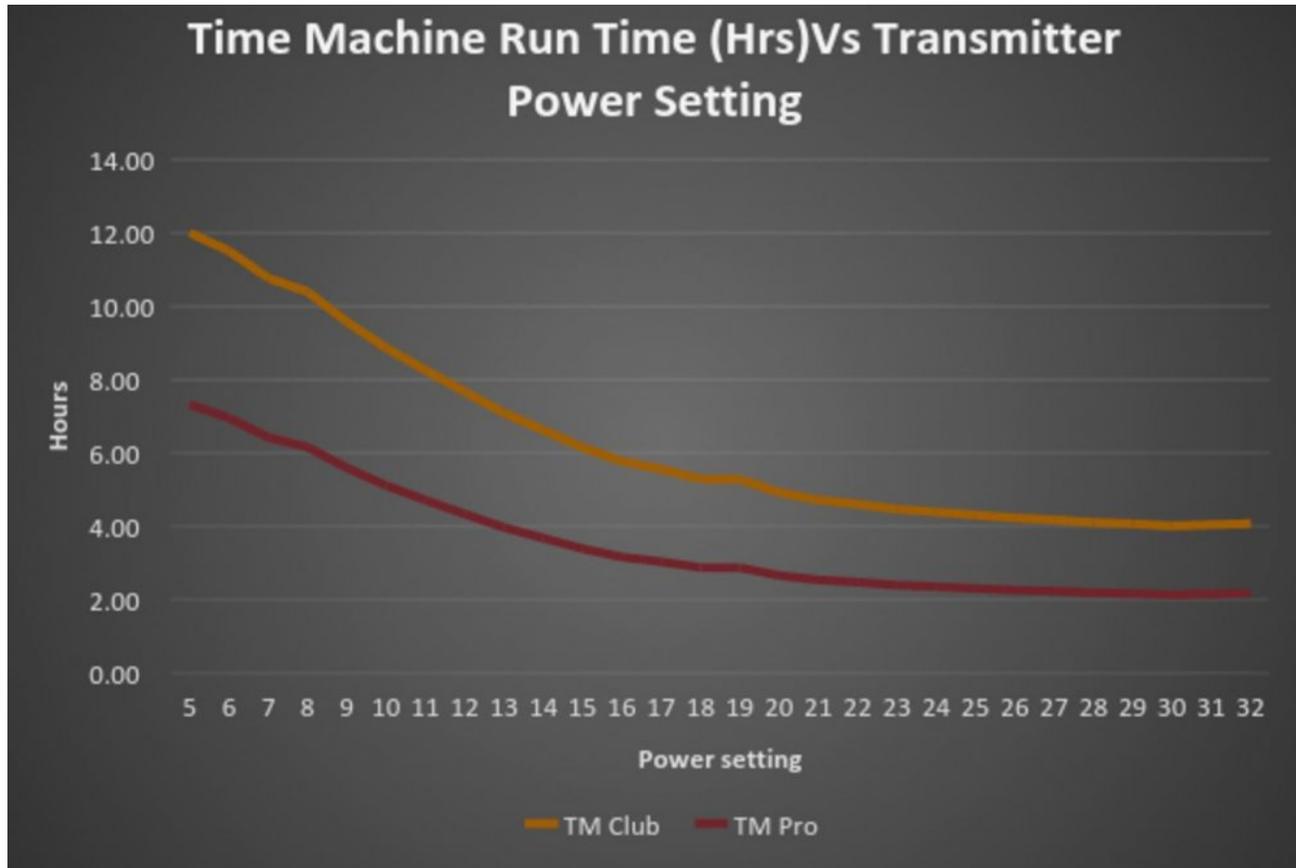
With the Factory Power setting of 13 you can expect around 4 hours with the Pro and about 7 hours with the Club.

Figure 2
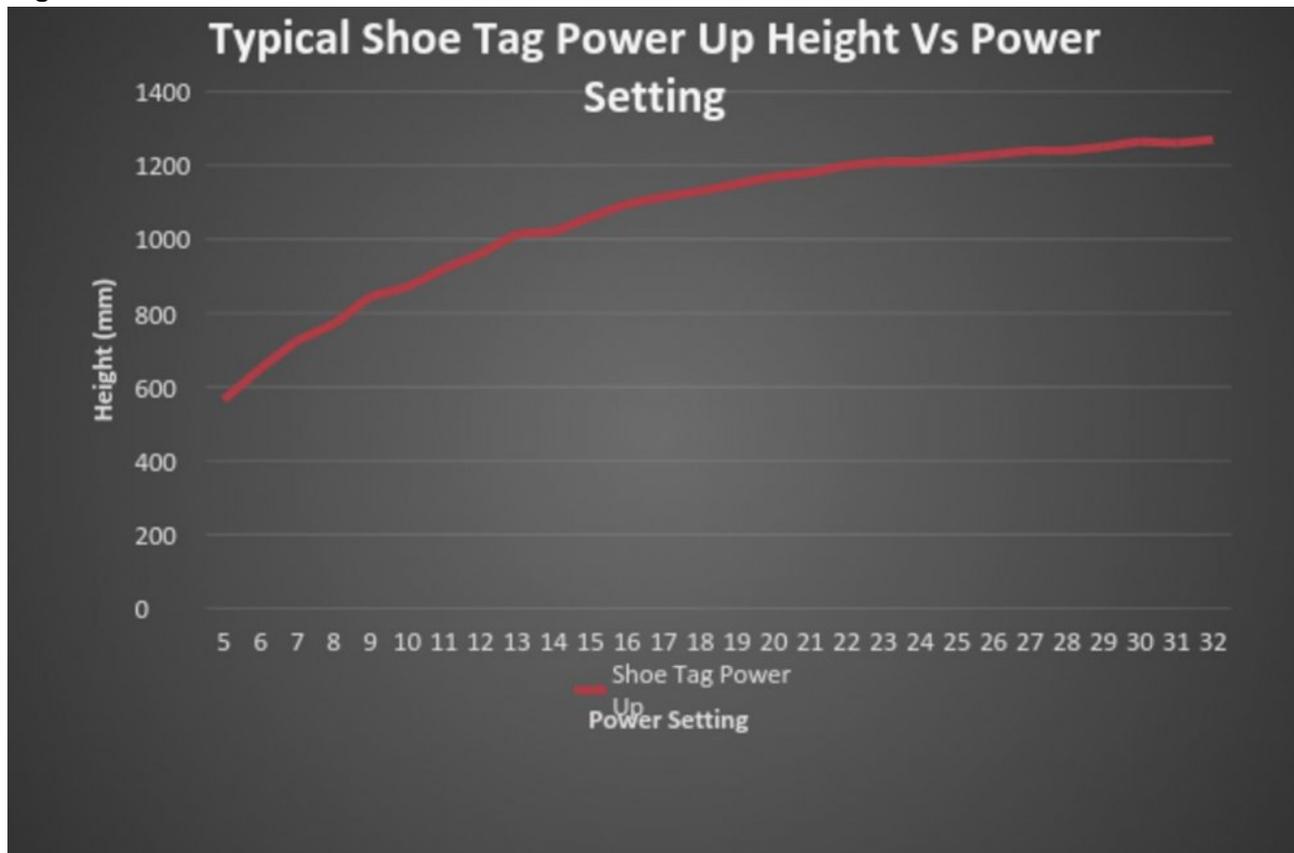
Power up for a shoe tag at the factory setting of 13 is about 1 meter (3' feet).

How do I know the Time Machine is Fully Charged?

The Time Machine includes a sophisticated Power Monitor that manages charging and protects the system from over-voltage (greater than 15V input) and being connected in reverse polarity. It also protects the battery from being flattened too much, beyond which the battery could be damaged, by shutting down at 10.5V.

The Power Monitor provides system messages on its health, which can be used by those who wish to write more sophisticated Event Timing software.

When a Smart Charger or Constant Potential charger is connected to the Time Machine, the Power Monitor displays the status of the charging process.

Note that, from a dead-flat battery state, it will take about 4 hours to fully charge the Time Machines' internal battery. The behavior you will observe during the charge process is explained below.

When the system is on charge the voltage supplied by the charger will be between 13.8 and 14.2 volts. The Power Monitor therefore sees greater than 12.6V so the top green LED will always be lit.

If current is flowing into the battery from the charger, the Blue LED will also be solidly lit.

When the battery is nearing the point where it is full, the Blue LED will start to blink. It is now on a trickle-charge and it will continue to 'trickle' until completely full.

When the battery is completely full, the Blue LED will extinguish because no current is flowing from the charger into the battery.

If you remove the charger before the battery is full, the Power Monitor will adjust the LEDs (downwards) to show how much charge has been achieved up to the point when you removed the charger.

So, in summary:

- If the charger is connected and turned on, and the Blue LED has extinguished, the battery is completely full.
- If the charger is connected and turned on, and the Blue LED is blinking, the battery is very nearly completely full (and is just being topped up). The smart-charger manages the top-up charge process to optimise the energy density of the battery.
- If the charger is connected and turned on, and the Blue LED is fully lit, the battery is still charging. It needs to be left on charge until at least it starts blinking, and preferably until extinguished.
- If you remove the charger its actual battery voltage will be shown by the Power Monitor.
- A full charge takes about 4 hours.
- Batteries should be topped up regularly (two-weekly or constantly) if the Time machine is not being used to extend their working life.

Packages

The following items are included with your TimeMachine system. Please check you have unpacked all items listed below before discarding any packaging. Replacement items can be obtained from your nearest Trident sales office.

Trident Club-XR Bundle

Club-XR Reader Qty 1	*Pro Mat (3m x 1.2m) Qty 2*	*Micro USB Cable Qty 1*
External Beeper Qty 1	*Mains Power/Charger Qty 1*	*Ethernet Cable Qty 1*

USB Radio Modem Qty 1		

The TimeMachine Club-XR reader has the following capabilities and features:

- Lightweight design and durable plastic case
- Ability to drive up to two Trident 3 meter or 6 meter reading mats; that's up to 12 meters in one line
- Fast, automatic tuning of mats to suit the surface they are placed on
- LCD status display to easily see tag read information and other important configuration settings
- Tag read and logging data stored on a microSD card
- USB download of logging data to your timing computer
- Ethernet networking for communication between the reader and computer
- WiFi for communication between the reader and computer
- Wireless networking between multiple readers and your timing computer
- LEDs and internal buzzer for notification of tag reads
- Internal battery for up to 5 hours of continuous use where no AC power is available
- External connector for supplementary power source, from either a battery or mains power supply
- Battery voltage displayed on LED bargraph display
- External Trigger connector for time stamp devices
- External Buzzer connector for use in noisy environments
- Fan and venting to stabilise internal temperature in warmer climates

Trident Active-XWR Bundle

Active-XR Reader Qty 1	Antenna Loop	Micro USB Cable Qty 1

External Beeper Qty 1

Mains Power/Charger Qty 1

Ethernet Cable Qty 1

USB Radio Modem Qty 1

- Key Features
- Robust, waterproof, small (L27 x W24 x H18 cm) durable plastic, latching case
- Supports four 18M Active Loop Antennas
- 12VDC, 9Ah internal battery
- Power monitoring system with LED battery level indicator
- Fully digital receiver technology
- Instant-ready system from power up. Start time is < 1 second.
- Color LCD display showing key information: – unique tag reads – IP address – socket in use – date/time and more.
- Robust connectors
- Trigger Timestamp Input
- External Beeper option
- External Display Clock interface (RS485)
- SD card data storage
- Bluetooth, Ethernet and USB
- Plug in a USB cable and the reader becomes a computer drive (e.g. E:) to extract files from
- Web Server administration
- Closing Contact Relay to initiate still camera or video recording on detection of tag

- Receivers and transmitters report their status
- Reverse polarity protection with fast acting breaker
- Internal Beeper (can be disabled by configuration)

Trident Pro-XWR Bundle

Pro-XWR Reader Qty 1　　　　*Pro Mat (3m x 1.2m) Qty 4*　　　　*Micro USB Cable Qty 1*

External Beeper Qty 1　　　　*Mains Power/Charger Qty 1*　　　　*Ethernet Cable Qty 1*

USB Radio Modem Qty 1

- Robust, waterproof, small (L27 x W24 x H18 cm) durable plastic, latching case
- Supports four (3M or 6M) Timing UltraMats

- 12VDC, 9Ah internal battery
- Power monitoring system with LED battery level indicator
- Fully digital receiver technology
- Instant-ready system from power up. Start time is < 1 second.
- Color LCD display showing key information
- Robust connectors
- Can support active transponders, with very large receive loop dimensions (up to 20m x 1m coverage, per loop, using standard hookup wire).
- Internal Beeper (can be disabled by configuration)
- Trigger Timestamp Input
- External Beeper option
- External Display Clock interface (RS485)
- SD card data storage
- Bluetooth, Ethernet and USB
- Plug in a USB cable and the reader becomes a computer drive (e.g. E:) to extract files from
- Web Server administration
- Closing Contact Relay to initiate still camera or video recording on detection of tag
- Receivers and transmitters report their status
- Reverse polarity protection with fast acting breaker

Optional Accessories

The following optional accessories are available to extend the functionality of your Trident Club-XR system. Please visit www.tridentrfid.com for more information or contact your nearest Trident sales office.

3 & 6 Metre Trident Mats

USB Reader

Trigger Starter

External Beeper


Auxiliary Battery Pack

Radio Antenna

Timing Clock

USB Radio Modem

Timing Tags

Shoe Tag

Bib Tag

Ankle Tag With Strap

Active Tag

Trident TagScan

Download our Tag Scanner program, to create a tag – Race Number mapping file. The File then can be imported into your timing software. Previous Tag scan files can be imported to use as a checking system to see what number has been assigned to a tag.

Download TagScan Now

Current Version is V1.4.0.12 . If you have TagScan installed , select the 'Check for Program Update' button.

INSTRUCTIONS FOR USE

- Plug in your Trident USB Registration reader.
- Select the USB Registration reader serial port from the list.
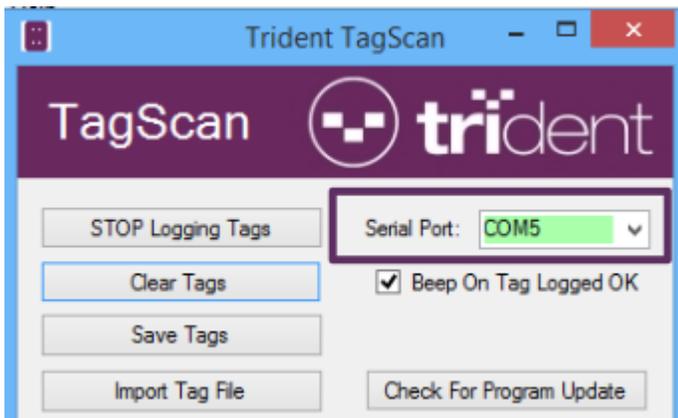
- Click the 'Start Logging Tags' button
- Scan tags into the mapping list by passing tags over the USB Registration reader.
- Last tag scanned is added to the bottom of the mapping list.

- Click the 'Save Tags' button to save the scanned tags to a file.
- Import the saved tag mapping file into your timing software as required.

Other Options:

- Click the 'Clear Tags' button to delete all previously scanned tags from the list
- To delete a single tag from the list, select the row and press the delete button on your keyboard.
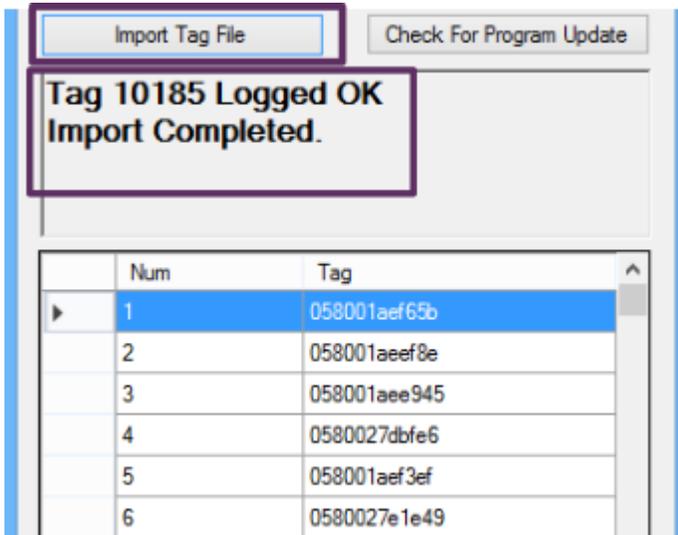

- To Change the numbering start value. click in the "Num" field of the last scanned tag and edit to the desired start number. Tags scanned after this will carry on from the new value.

Importing a Previous Tag File

- Select the 'Import Tag File' button and browse for your file.
- File will Import and show the number of tags imported.

- When a tag is scanned and the tag ID is contained in the file, the Number associated with the Tag is shown and record will be displayed.

Trident TinyScore

TinyScore is both a tool for managing your TM Reader and timing basic races.

It is capable of running events with mat starts and gun starts, with up to 3 category Groups that can be used for Event, Gender, Category etc.

There is a very comprehensive in-built help file that can be accessed by pressing the F1 key when Tinyscore is open. The help manual should be all the support you need to get up and running.

TinyScore is a Free program for all owners of Trident Systems.

The download below 100% safe and contains no malware. Your Anti-virus software may class it as a threat due to the .exe file name. You may have to disable your antivirus while downloading.

Download TinyScore Now

Introduction

The Trident TinyScore application will allow you to explore the capabilities and functionality of Trident TimeMachine readers. TinyScore can communicate with the reader via cabled Ethernet, Wi-Fi or USB RFD900 Radio connections and log tag reads to a database. Basic timing results can be displayed using the built-in reports, or the tag read information can be exported to a spreadsheet where you can do customised reporting. The database is stored in folder C:\Trident TinyScore, along with this document.
As with any other computer data file, you are advised to make backups of the TinyScore database file C:\Trident TinyScore\TagLogging.db as required. Trident cannot recover or repair a damaged or corrupt TinyScore database file.

We hope you will find the Trident TinyScore software useful to you but it is supplied to you free, and "as-is", without any express or implied warranty to suit any particular use. In no event shall Trident RFID, or its contractors, be held liable for any loss or damages arising from the use of the software.

THE NAVIGATION TABS

TinyScore information is displayed in different screens accessed by clicking on the various tabs near the top. The "Live Tag Data" screen will be displayed when the program is first started.

You can display basic help (this document) in any screen by pressing the F1 key on your keyboard.

Reader Setup Tab

Press the F1 key for Help on using TinyScore

This screen looks a little complicated but don't worry about it too much as the default settings will allow communication between the TimeMachine reader and your computer via an Ethernet cable, or Wi-Fi connection. If any of the information boxes have a RED background, you are unlikely to be connected to the reader. A GREEN background indicates that particular setting is OK.

Most functionality in this screen requires connection to the reader via Ethernet cable or Wi-Fi. Some of the functions on this screen will be greyed out (disabled) if TinyScore is not connected to the readers "Command Port", like when you are only using a Serial Port connection.

If you have changed a setting and you can no longer receive tag reads from the reader, feel free to use the "Click Here To Reconfigure All Settings To Their Default Values" button, and it will do as it says! TinyScore program will be closed and restarted, but now with the default reader communication settings.

Reader IP Address:

The reader's default IP address is 192.168.0.101 and your computer will likely be automatically assigned the next available IP address of 192.168.0.102. Just make sure your computers network adapter TCP/IP settings are set to "Obtain IP Address Automatically" which they are unless you had previously modified these settings.

Ping Response Time:

TinyScore will continually send out network tests to the reader every second or so and display the response time. If TinyScore does not see a response from the reader for more than 10 seconds, it will consider the network connection as failed and therefore automatically disconnect from the reader until it sees successful network ping tests. You cannot modify this information as it is populated automatically.

Reader Command Port:

The reader command port is used to send and receive configuration commands to the reader. You will normally leave this set to the default setting 9999.

Reader Data Port:

The reader data port is used to receive tag read messages from the reader. You will normally leave this set to the default setting 10001 to receive "filtered" tag read messages. If required, you can change this to 10000 to look at the "raw" tag read messages to view every single tag read but this is usually not required and sends a large amount of irrelevant information.

Computer Date/Time:

Pretty self-explanatory… This shows your computers current date & time. You cannot modify this information as it is populated automatically.

Reader Date/Time:

The reader's date & time is retrieved approximately every second and displayed here. The reader time is only available when connecting to the reader using Ethernet cable / Wi-Fi and the readers' IP Address & Command Port are valid. The reader time is unavailable when connecting using a serial port (eg. USB Radio Modem adapter). You cannot modify this information as it is populated automatically.

Reader Time Difference:

Displays the difference between your computer's time and the reader's time. If it's more that 2 seconds difference then it will be highlighted with a RED background. Use the adjacent "Set Reader Date/Time" button to synchronize the reader to your computer's time. You cannot modify this information as it is populated automatically.

Marker Text:

This function can be used to insert a timestamp, and text from the "Marker Text" field, into the reader's tag logging file stored on its internal micro SD card. You can enter text here which is written to the reader's internal tag logging file when you click the adjacent "Insert Marker" button.

Serial/COM Port:

This allows TinyScore to receive tag read messages from the reader's Radio Modem using the Trident USB Radio Modem adapter. It can also be used to receive tag read messages from the Trident USB Registration

Reader adapter. Just plug in the required USB adapter, load Windows drivers if required, and select the detected COM port in TinyScore. Also select the appropriate speed in the adjacent box – A Trident USB Radio Modem uses a speed of 115200 baud, a Trident USB Registration Reader uses a speed of 9600 baud so set this to match the device you are using. You will likely want to log tag reads to the TinyScore database so also ensure the adjacent "Yes! Log Serial Port Tags" is selected. If you just want to use the serial port communication for automatic tag registration into the "Tag Registration" database, select "Don't Log Serial Port Tags" and they won't be logged as "Tag Reads".

Important notes on using serial port communication follow:

- If you are ONLY using the USB Radio Modem adapter to communicate with the reader, set the "Reader IP Address" to your computers loopback address of 127.0.0.1 so TinyScore's Ethernet connectivity tests will have something to talk to.
- If you are not using either of these USB serial port devices, set the COM port to "NONE" and TinyScore won't nag you about serial port connection problems.
- Currently you cannot send any commands to the reader via a serial port connection, and these options and buttons will be greyed out. The serial port connection can only be used to receive tag read data into your computer. This means TinyScore won't be able to check/set the reader date & time (and most other functions) via serial port connection – Commands can only be sent using the reader's IP Address and Command Port over Ethernet / Wi-Fi connection.

Event Name (for reports):
The text entered here is displayed at the top of the Results Report screens. Use this to customise the report titles.

Show Program Events:
Opens a background window showing progress of some of the TinyScore background processes. This can be used to diagnose why you are not communicating with the reader, or not receiving tag reads.

Export All Database Records:
Opens a report showing all logged tag reads in the TinyScore database. You can export this data to a spreadsheet for customised reporting, or to save the event tag reads so you can look at them after clearing logged tag reads from TinyScore's tag read database.

Clear Tag Reads Database:
Deletes logged tag reads from the TinyScore database. This may be useful to clear out your "test" tag reads before actually timing an event. This does NOT delete Tag Registration or Timing Points information.

Import Tags From Reader Log File:
This can be used to retrieve tag data directly from the reader's internal logging files, which you may find

useful if your computer stopped communicating with the reader while timing an event. Just connect the reader to your computer using the microUSB cable, browse for the readers' detected "Removable Disk" drive and click OK to start the import. Any tags not already in the TinyScore database will be imported, any duplicates will be ignored.

> ✳ Don't forget to unplug the microUSB cable from the reader when the import has completed as the reader will NOT log any tags while it's plugged into your computer via the microUSB cable.

Clear Reader History:
Clears all tags reads from the reader's internal logging file, stored on the readers internal microSD card.

Restart Reader:
Sends a "restart" command to the reader. This causes the reader to restart as if you had just turned it on, the mats will be automatically retuned etc. and TinyScore will automatically reconnect as soon as the reader has completed its restart procedure.

Enable Gun-Start Timing
Enabling Gun-Start Timing mode changes the way tag reads are time-stamped. Basically a "stopwatch" is started at 00:00:00 when TinyScore receives an External Trigger (Gun-Start) message from the reader and all subsequent tag reads are logged using this "stopwatch" time as the tag read timestamp (as opposed to using the current date & time from the reader's tag read message when Gun-Start mode is disabled). When Gun-Start Timing mode is enabled, you will notice a "Start" picture in the top-left corner of TinyScore.
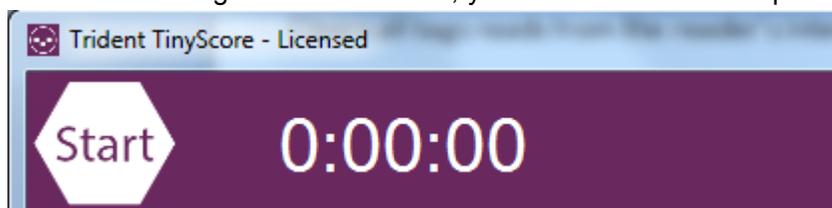
The stopwatch timer is shown adjacent to the Start picture. Clicking the Start picture has exactly the same effect as if TinyScore received an External Trigger message from the reader – it will start or stop the stopwatch timer in the same way. Whenever the Gun-Start stopwatch is started, all logged tag reads are deleted from the TinyScore database (exactly as if you clicked the "Clear Tag Reads Database" button) so timing the event starts with no tags logged. This does not affect tags in the Tag Registration database, they stay as-is. You will get a warning when the Gun-Start stopwatch is stopped, as starting the stopwatch again will delete all logged tag reads – this is to help prevent accidental stop/restart of the stopwatch which will delete all tag reads… You don't really need to stop the Gun-Start stopwatch after timing the event is finished (as you may accidentally start the stopwatch again) unless you have saved or printed the results reports.

Log Gun-Start Tags:

This function enables or disables logging a Gun-Start tag record for all registered tags (tags registered in the Tag Registration tab) when a gun-start message is received. Disabling logging of these Gun-Start tag messages can make the reports look better by not having the Start time listed.

Click Here To Reconfigure All Settings To Their Default Values:

If you have changed a setting and you can no longer receive tag reads from the reader, feel free to use the "Click Here To Reconfigure All Settings To Their Default Values" button, and it will do as it says! TinyScore program will be closed and restarted, but now with the default reader communication settings.

Check For Program Update

From time to time we may publish bug fixes or add features to TinyScore. As it suggests this button will check for any update to the TinyScore program, and download/install as necessary. You will need an internet connection to check for updates. To avoid disappointment, don't install an update while timing an event as something may go wrong… We are dealing with computers after all. Also you should test operation of TinyScore after you have performed an update to make sure it works as expected.

Tag Registration Tab

Tag ID	Bib No	Name	Group1	Group2	Group3
058000052915	100	Pam Freeman	Short	Female	Open
05800005361e	101	Joe Mitchell	Sprint	Male	Open
058000079115	102	Heather Swanson	Short	Female	Open
058000052f16	103	Laverne Nelson	Short	Female	Open
058000050a14	104	Adrian Cruz	Sprint	Male	Open
084100074f1f	105	Edwin Goodwin	Sprint	Male	Vet
059700079627	106	Stephanie Scott	Sprint	Female	Vet
05800249841a	107	Lillian Beck	Short	Female	Vet
0580015ec847	108	Evan Butler	Sprint	Male	Vet
05800017825f	109	Dominick Hansen	Sprint	Male	Vet

This screen displays tags that have been registered into the TinyScore Any new tags detected are automatically added to the database. To see them, click on the "Refresh Tag List" button. For the reports to show meaningful results, you will need to populate BibNo, Name and possibly Group1, Group2 and Group3 information as required. Click in the various boxes to edit this information, and press the Enter button to finish editing. To delete an individual tag from the registration database, click on the left of the row (so the whole row is highlighted) and press the Delete button on your keyboard.

Column Description & Usage:

- **Tag ID** – The serial number of the detected tag, extracted from the readers tag read data. This cannot be modified.

- **Bib No** – Represents the bib number assigned to the competitor/tag combination. It doesn't necessarily need to represent an actual bib, you could use it as "Bike Number", "Vehicle Number" etc. but it needs to be unique for each tag (unless you attach more than one tag to a competitor!) as results are grouped by Bib No information.
- **Name** – Assign a name to the tag / bib to make it easier to identify which competitor corresponds to a particular tag read.
- **Group1** – Assign a group (or class) to a tag or a group of tags so results in the "ByGroup" reports will be grouped by these group names. This field can be left blank so all results would be grouped together.
- **Group2** – A second level of participant grouping where you may assign a group (or class) to a tag or a group of tags so results in the "ByGroup" reports will be grouped by these group names. This field can be left blank so all results would be grouped together at this grouping level.
- **Group3** – A third level of participant grouping where you may assign a group (or class) to a tag or a group of tags so results in the "ByGroup" reports will be grouped by these group names. This field can be left blank so all results would be grouped together at this grouping level.

Buttons along the top allow you to manually insert a Tag ID, import a pre-populated spreadsheet of tag registration information, delete all tag registration information from the TinyScore database, and refresh the display. You can click on the column header names to sort the list by that particular column.

Registration Report Tab

This screen allows you to display/print/sort/export the Tag Registration database information. Click on the arrows in the column headers to sort by that particular column. Buttons at the top of the report allow you to print/export etc.

Timing Point Tab

Mat ID	Timing Point	Log Record Type
Z1	1. Start	LS
Z2	2. Transition to Cycle	FS
Z3	3. Transition to Run	FS
Z4	4. Finish	FS

This screen displays Timing Points (individual reader/mat combinations) that have been registered into the TinyScore database and is updated every second or so. Any new Timing Points are automatically added to the database as they are detected. Click in the Timing Point or Log Record Type boxes to edit this information as required, press the Enter button to finish editing. To delete an individual timing point from the database, click on the left of the row (so the whole row is highlighted) and press the Delete button on your keyboard.

Column Description & Usage:

- **Mat ID** – The "Mat ID" information comes from the reader and is a combination of the reader ID (in this case "Z") and the receive mat ID which corresponds with the receive port numbering on the reader. You can use this to uniquely identify each individual mat in your timing setup.
- **Timing Point** – Results reports are sorted by the "Timing Point" information text, not the "Mat ID" information. You could be creative in naming the timing points, or prefix them with a number as shown above so they will get sorted in accordance with race stages.
- **Log Record Type** – This information determines what tag read information from the reader will be logged to the TinyScore database. The default for new timing points is to log "First Seen" records only. You can set this to the following options:

FS First Seen
LS Last Seen
BS Best Seen
RR Raw Record
ALL All records will be logged

Live Tag Data Tab

Tag ID	Bib Number	Tag Name	Tag Group	Tag Date ▲	Timing Point	Mat ID	Type	RSSI
058000052915	100	Pam Freeman	Short	2015-09-01 00:00:02.59	USB Registration Reader	00	--	--
05800005361e	101	Joe Mitchell	Sprint	2015-09-01 00:00:02.97	USB Registration Reader	00	--	--
05800005361e	101	Joe Mitchell	Sprint	2015-09-01 00:00:03.14	USB Registration Reader	00	--	--
058000052f16	103	Laverne Nelson	Short	2015-09-01 00:00:03.98	USB Registration Reader	00	--	--
058000050a14	104	Adrian Cruz	Sprint	2015-09-01 00:00:04.14	USB Registration Reader	00	--	--
058000052f16	103	Laverne Nelson	Short	2015-09-01 00:00:04.49	USB Registration Reader	00	--	--
058000050a14	104	Adrian Cruz	Sprint	2015-09-01 00:00:04.67	USB Registration Reader	00	--	--
058000050a14	104	Adrian Cruz	Sprint	2015-09-01 00:00:05.63	USB Registration Reader	00	--	--
05800005361e	101	Joe Mitchell	Sprint	2015-09-01 00:00:05.87	USB Registration Reader	00	--	--
05800017825f	109	Dominick Hansen	Sprint	2015-09-01 00:00:06.07	USB Registration Reader	00	--	--
05800017825f	109	Dominick Hansen	Sprint	2015-09-01 00:00:06.87	USB Registration Reader	00	--	--
05800017825f	109	Dominick Hansen	Sprint	2015-09-01 00:00:07.16	USB Registration Reader	00	--	--
0580015ec847	108	Evan Butler	Sprint	2015-09-01 00:00:07.66	USB Registration Reader	00	--	--
05800017825f	109	Dominick Hansen	Sprint	2015-09-01 00:00:08.64	USB Registration Reader	00	--	--
05800017825f	109	Dominick Hansen	Sprint	2015-09-01 00:00:08.92	USB Registration Reader	00	--	--
0580015ec847	108	Evan Butler	Sprint	2015-09-01 00:00:09.85	USB Registration Reader	00	--	--

This screen displays tag reads as they are received by TinyScore so you can use it to confirm you are receiving tags from the reader and you have the correct "Log Record Type" set against a particular Timing Point. The newest tag read will be at the bottom of the list and they will scroll upwards as new tags are detected. You cannot edit information in this screen.

Column Description & Usage:

- **Tag ID** – The serial number of the detected tag
- **Bib Number** – The bib number assigned to the tag in the Tag Registration screen
- **Tag Name** – The Name assigned to the tag in the Tag Registration screen
- **Tag Group** – The Group assigned to the tag in the Tag Registration screen
- **Tag Date** – The date/time the tag was detected by the reader
- **Timing Point** – The mat that the tag crossed when it was detected
- **Mat ID** – The mat id information from the reader, corresponds to the Timing Point
- **Type** – The record type that was logged for that particular timing point. Often you may want to set the "Start" mat as Last Seen (LS) record type as shown above to log tags as the competitors leave the start line…
- **RSSI** – The received signal strength from the tag. This is only visible with Raw Record (RR) record types. This data is only available if the TimeMachine reader is configured to sent signal strength information.

Overall Results Report Tab

This screen displays the results of the logged tag reads, grouped alphanumerically by "Timing Point" and then sorted by "Tag Date" with the oldest (first) tag at the top of each group.

If there were multiple tag reads for a particular Bib No (tag) at a particular Timing Point, click on the "+" to expand the list to see all later tag reads

Buttons at the top of the report allow you to print/export etc.

By Group1 Results Report Tab

This screen displays the results of the logged tag reads, grouped alphanumerically by "Group1" then grouped by "Timing Point" and finally sorted by "Tag Time" with the oldest (first) tag at the top of each group.

If there were multiple tag reads for a particular Bib No (tag) at a particular Timing Point, click on the "+" to expand the list to see all later tag reads

Buttons at the top of the report allow you to print/export etc.

By Group1 & Group2 Results Report Tab

This screen displays the results of the logged tag reads, grouped alphanumerically by "Group1" then grouped by "Group2", also then grouped by "Timing Point" and finally sorted by "Tag Time" with the oldest (first) tag at the top of each group.

If there were multiple tag reads for a particular Bib No (tag) at a particular Timing Point, click on the "+" to expand the list to see all later tag reads

Buttons at the top of the report allow you to print/export etc.

By Group1, 2 & 3 Results Report Tab

This screen displays the results of the logged tag reads, grouped alphanumerically by "Group1" then grouped by "Group2" then grouped by "Group3", also then grouped by "Timing Point" and finally sorted by "Tag Time" with the oldest (first) tag at the top of each group.

If there were multiple tag reads for a particular Bib No (tag) at a particular Timing Point, click on the "+" to

expand the list to see all later tag reads

Buttons at the top of the report allow you to print/export etc.

USB Registration Reader Driver

Before you will be able to conect your USB Registration Reader you will have to download the driver software dependent on which version

[Click here to find out if you need 32-bit or 64-bit](#)

Download for 32-bit Windows Systems

Download for 64-bit Windows Systems

TimeMachine Firmware Update

Download Current Firmware

Download Previous Firmware

Current version is v0.188

Click here to view the change log.

How do I update the firmware on my TimeMachine?

1. Download the current firmware above (if you encounter problems, please follow these instructions and use the previous version).
2. Ensure reader is turned off
3. Connect reader 's micro USB socket to your computer using a micro USB cable
4. Hold down the Tune button and turn the reader on
5. Ensure reader display says "Trident USB Bootloader"
6. Using Windows explorer, browse to the detected disk drive called "Trident BL"
7. Delete any existing file from this disk, usually called "firmware.bin"
8. Copy the new firmware file to this disk
9. Use Windows "Safely Remove Hardware…" icon to eject the "Trident Bootloader" device
10. Unplug the micro USB cable from the reader
11. Power off the reader, then power on again
12. Ensure the new firmware version is displayed at the top of the reader screen

> **!** ONLY ATTEMPT TO UPGRADE FIRMWARE USING A NATIVE MICROSOFT WINDOWS COMPUTER.
> Do NOT use Windows emulators/Virtual Machines, these operating systems are not supported for Firmware updates.

Firmware change log

[Click here to view the change log.](#)