

MODEL C846
SHOW JUMPING TIMER

INSTRUCTIONS

NOTE

The C846 timer can now add added time (time penalties) to the displayed time.

This is switched on and off at the same time as the countdown option is set.

If the timer is stopped, the calculation is made when the timer re-starts.

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IMPORTANT NOTES

- The display screen goes blank after a period of inactivity in order to save power.

The timer is still switched on, and timing will be started as normal.

Starting the timer or pressing **ZERO** or any of the keypad buttons will activate the screen.

- Although the heads are designed for outdoor use, the timer is not, and must **not** get wet.

Glossary: see page 28 if you are unfamiliar with any terms used in this booklet.

Conventions: **TEXT SHOWN THUS** indicates a control button or key on the timer, or a connector on the rear of the timer.
Text shown thus indicates a message shown on the timer screen.

Getting Started

Before use the timer (and the wire-free heads) should be charged for 24 hours. One charger will charge the timer and two heads all at the same time. To charge, plug the charger lead into the **CHARGE** socket on the rear of the timer. The red light next to the socket will come on.

To open the timer case, pull the **top** of the catch towards you.

When the timer lid is opened, the aerial socket is in the top right edge of the lid and the aerial is clipped inside the lid. Insert the aerial into the socket if wire-free gates are to be used. Do not lose the aerial as replacements are expensive.

Press the **ZERO** button to switch the timer on.

A **welcome** menu will appear. The novice user is advised to press the **1** key, which will program the timer for standard Show Jumping timing.

Adjust the **CONTRAST** and **BRIGHTNESS** until a clear display is obtained.

The timer can be controlled manually using the **START**, **STOP** and **ZERO** buttons (the timer must be stopped before it can be zeroed).

For automatic timing first set up the gates as described on page 14.

Pull the **START GATE** switch towards you (to arm the start gate) as the competitor approaches the start line. The timer will start when the competitor breaks the start beam.

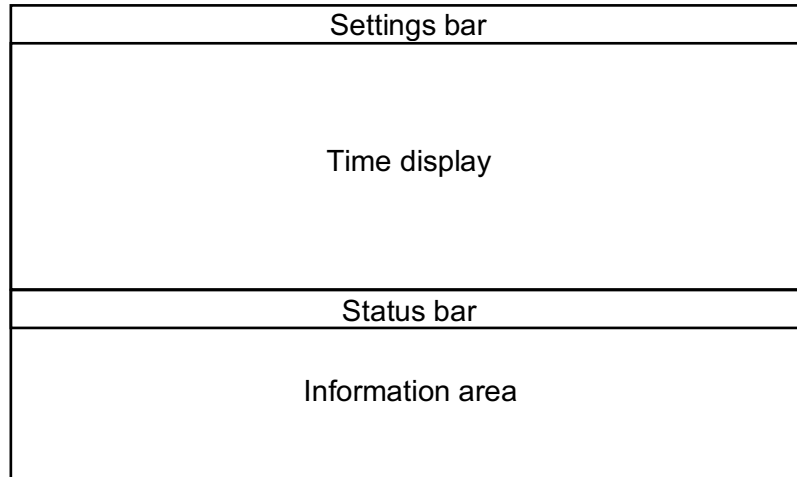
Pull the **FINISH GATE** switch towards you (to arm the finish gate) as the competitor approaches the finish line. The timer will stop when the competitor breaks the start beam.

To switch the timer off, press the **OFF** key.

The Timer Screen

In menu mode, the screen displays a list of settings and the particular option selected for each setting.

In timing mode, the screen is divided into four areas, as illustrated:



Settings bar: this shows some of the settings that have been selected for the current timing mode.

Time display: this shows the competition time.

Status bar: this shows warnings if the timer battery is low, or if the public display or fastest time display are switched off. It also shows the current gate channel.

Information area: this shows additional information specific to the current timing mode.

The top and bottom items show different things for each mode. Here is a summary:

Mode	Settings bar	Information area
Show Jumping	Class number Competition type Countdown setting	Lead competitor Last competitor Competitor number Jumping faults Time penalties Time faults
Polo	Mode	Home score Away score
Marathon	Mode	Settings menu *
Countback	Mode	Settings menu * Home score Away score
Time of day	Mode	Settings menu *
Test	Mode	<blank>

* in these modes, you must press an arrow key to make the menu visible.

Special Features of the Timer

Gate Memory

Normally the start or finish gate must be *armed* before a competitor crossing the beam will start or stop the timer.

A gate is armed by pulling the **START GATE** or **FINISH GATE** switch towards you. The gate is disarmed by pushing the switch away from you. The red **SET** lamp lights when a gate is armed.

The timer is designed to give a correct time even if a competitor passes the start or finish with the gate accidentally not armed. In these circumstances a buzzer will sound for 10 seconds. If, during this time, the **MEMORY** button is pressed, the timer will start from the time the start beam was crossed, or will stop from the time the finish beam was crossed, as appropriate.

If this is not required, do nothing - at the end of the 10 seconds the buzzer will stop. Or you may press **ZERO** to cancel the buzzer.

This facility can be switched off, or the 10 second period can be changed to 5 or 20 seconds using the menu (see p 19).

There is no gate memory in Countback, Marathon or Polo modes.

Bell

The timer incorporates an electronic 'bell' that can be connected to a public address system to provide an audible warning to competitors. Eight different sounds are available, and the signal can be adjusted for different amplifier requirements.

To 'ring' the bell:

Press the **BELL** key on the timer.

Press the **BELL** button on the remote console if one is available.

Press the **COUNTDOWN** button on the remote console if one is available.

The bell can be sounded automatically in these circumstances:

{**Bell mode**: in the main menu must first be set to **Auto**}

Show Jumping 45s topscore competitions - at the end of 45 seconds (see p 5).

Show Jumping 60s topscore competitions - at the end of 60 seconds (see p 5).

Polo timing - at the end of extra time, or if the stop button is pressed during extra time (see p 10).

Countback timing - when the timer has reached zero (see p 11).

To make the bell to sound automatically:

Press the **MENU** key.

Press ↓ five times so that **Bell mode**: is highlighted.

Press ← or → until **Auto** is shown.

Press **ENT**.

To change the sound of the 'bell':

Press the **MENU** key.

Press ↓ six times so that **Bell sound**: is highlighted.

Press ← or → until the desired sound is shown.

Press **ENT**.

To change the output signal:

Press the **MENU** key.

Press ↓ seven times so that **Bell output**: is highlighted.

Press ← or → until the desired type of output is shown.

Press **ENT**.

{Line is suitable for connecting to the 'line' or 'aux' socket on an amplifier,
Mic is suitable for connecting to the 'microphone' socket on an amplifier,
Relay is suitable for operating an external bell or 'traffic lights' (see p 25).

Bell Mode Setting

This has different effects in different timing modes. The setting is automatically changed to the default value each time the timing mode is changed.

You must alter the 'Bell mode' setting *after* changing the timing mode if you do not want to use the default setting.

Show Jumping:

Normal setting

An external bell button will **not** start the countdown timer. Use the yellow **BELL** button on the timer or the yellow **COUNTDOWN** button on the remote console.

In two phase competitions if there are faults in phase 1, the timer will continue to time phase 2.

Phase 2 must be stopped manually by pressing the **F:A** button.

For topscore competitions the buzzer in the timer will sound at the end of the 45 or 60 seconds, but the bell must be rung manually.

Auto setting

An external bell button **will** start the countdown timer (if countdown is enabled).

In two phase competitions if there are faults in phase 1, the timer will **not** start phase 2.

For topscore competitions the bell will sound automatically at the end of the 45 or 60 seconds.

The default setting is **Normal**.

Polo and Countback modes:

Normal setting

At the end of the competition the buzzer in the timer will sound but the bell must be rung manually.

Auto setting

At the end of the competition the bell will sound automatically.

The default setting is **Auto**

Show Jumping - Normal Competitions

Standard Timing

Press the **ZERO** button to switch the timer on.

The simplest way to program the timer for straightforward show jumping timing is to press 1 when the **we1come** menu is displayed. This is displayed when the timer is first switched on and can be recalled at any time by pressing **MENU** followed by **CLR**.

Set up the gates (see p 14).

If wire-free gates are used, make sure the aerial that is clipped inside the lid of the timer is plugged into the socket on the top right edge of the timer lid. The timer must be set to the same channel as the heads.

All the standard timing functions are available using the **START**, **STOP** and **ZERO** buttons and the **GATE** switches.

The timer will automatically start from zero if it is triggered by the start gate or by the **MEMORY** button.

If you are starting the timer manually with the **START** button you must zero the timer manually. It is best to zero the timer first in any case.

Public display. This normally shows the time, but a menu option allows it to show the competitor number before the timer starts, and then show the time once it has started (see p 19).

Slave display. Menu options (see p19) allow it to show:

The competitor number before the timer starts, and then show the time once it has started.

The fastest time (including time penalties).

The competitor number (left) and the jumping faults (right).

Switching off the timer will loose some data (fastest time and last competitor's time, for example).

The timer will automatically switch to the power saving standby mode after a period if it is not actually running. There is usually no need to switch off until the end of the day. To switch off, press the **OFF** key.

Single Gate Operation

A single gate can be used for start and finish. The head must be set up as a start head. Only the start gate **BEAM** lamp will operate, the finish **BEAM** lamp will light permanently.

The gates are armed as though there were two gates.

Topscore Competitions

For Topscore competitions, a buzzer will sound after 45 or 60 seconds. The bell can be selected to sound.

To select Topscore:

First make sure that you are in Show Jumping mode.

Press the **SET CLASS** key.

Press ↓ twice so that **Competition:** is highlighted.

Press ← or → until the correct Topscore option is shown.

Press **ENT**.

To make the bell to sound automatically:

Press the **MENU** key.

Press ↓ five times so that **Bell mode:** is highlighted.

Press ← or → until **Auto** is shown.

Press **ENT**.

Countdown Timer

The countdown timer starts at 45 seconds and counts down to zero. If the competitor has not crossed the start beam by that time, the timer is started automatically.

This setting also determines whether time penalties are added to the time shown on the screen and the public display.

To enable the countdown timer:

First make sure that you are in Show Jumping mode.
Press the **SET CLASS** key.
Press ↓ three times so that **Countdown:** is highlighted.
Press ← or → until the correct countdown option is shown.
Press **ENT**.

To start the countdown timer:

The countdown is started when the yellow bell key on the timer is pressed. *The timer must be set to zero first - if it is not, a warning will sound and the countdown will not be started.*
If remote buttons (see page 16) are attached to the timer, the countdown can be started by pressing the remote **COUNTDOWN** button. In this case it is not necessary to zero the timer first.
If a remote bell button is attached to the timer it can be used to start the countdown, but only if **Bell mode:** on the main menu is set to **Auto** (this is not the usual setting). *The timer must be set to zero first - if it is not, a warning will sound and the countdown will not be started.*

If the countdown timer is started in error, it can be cancelled by pressing **ZERO**.

The countdown timer can be interrupted using the **STOP** and **START** buttons, but pressing **START** when the countdown is running will cancel the countdown and start timing proper.

Normally, during the countdown period, the display shows the countdown time with a preceding minus sign. If the 45 second period ends during the start memory period, the public display is blanked until either the **MEMORY** button is pressed or the memory period ends. The correct time is then displayed.

Fault Calculation

The timer will calculate time faults automatically and will record total time and faults for compiling a results list that can be viewed later (see p 13). For the results list to be meaningful, a class number should be entered for each competition, and the date setting (see p 12) should be correct.

To set the class number:

First make sure that you are in Show Jumping mode.
Press the **SET CLASS** key.
With **class:** highlighted, key in the class number.
Press **ENT**.

To set the allowed time and fault rate:

First make sure that you are in Show Jumping mode.
Press the **SET CLASS** key.
Press ↓ until **Allowed time:** (called **Phase 2 time:** for two phase competitions) is highlighted.
Key in the allowed time.
Press ↓ until **Faults rate:** is highlighted.
Press ← or → until the correct fault rate is shown.
Press **ENT**.

For two phase competitions, repeat for the phase 1 allowed time and fault rate.

The Show Jumping timing screen must be visible to perform the following functions.

To enter a competitor number:

Key in the competitor number, then press **ENT**.

The competitor number appears at the bottom of the screen, and may also be shown on the public display.

To enter jumping faults:

Key in the faults, then press **FAULTS**.

The faults are added to the existing total that appears at the bottom of the screen and may also be shown on the slave display.

If an error is made, press **CLR** then press **FAULTS** to clear the faults total and you can begin again.

To enter time penalties (also known as added time):

Key in the time penalties, then press **ADD TIME**.

The penalties are added to the existing total that appears at the bottom of the screen.

If an error is made, press **CLR** then press **ADD TIME** to clear the penalties total and you can begin again.

*If the number of faults or penalties exceed 99 (the maximum allowed), **F** is shown.*

If a competitor retires or is eliminated:

Press **RET** or **ELIM**.

The faults will change to **r** or **E** (if the slave display is showing faults, it will show **F**, not **r**).

If you make an error:

Press **UNDO** to cancel the last change to competitor number, faults or time penalties.

There is only one level of undo.

Time faults:

These are calculated continuously according to the allowed time, fault rate and time penalties. They are shown at the bottom of the screen (as **TF**).

Fastest time:

The lead competitor's number, time (including time penalties) and faults (including time faults) are shown on the bottom left of the screen. The fastest (lead) time can also be shown on the slave display. The fastest time is calculated taking into account time penalties, jumping faults and time faults.

The fastest time is cleared when the class or round is changed (using the class settings menu) or when the timer is switched off.

Last time:

The last competitor's number, time (including time penalties) and faults (including time faults) is shown on the bottom left display screen.

For two phase competitions, it is the previous phase that is shown.

The last time is cleared when the class or round is changed (using the class settings menu) or when the timer is switched off.

In accordance with BSJA rules, the main time display does **not** include any time penalties.

The display of lead time and last time **does** include time penalties.

The display of time faults **does** include time penalties.

To view the results:

See the instructions on page 13.

Limitations: Maximum course time + penalties = 799 sec
Maximum jumping faults + time faults = 99
Maximum time penalties = 99

Show Jumping - Two Phase Competitions

Introduction

To time a two phase competition, three gates are normally used.
If wired heads are used, an optional 'Two Phase Adapter' will be required so that the start and intermediate heads can both be plugged into the start socket on the timer.

In the arena:

- Set the start gate to **CH1-S**.
- Set the intermediate gate to **CH2-S**.
- Set the finish gate to **CH2-F**.

On the timer:

- First make sure that you are in Show Jumping mode.
- Press the **SET CLASS** key.
- Press ↓ twice so that **Competition:** is highlighted.
- Press ← or → until **Two Phase** is shown.
- Press ↓ until **Gate channel:** is highlighted.
- Press ← or → until **2 Green** is shown.

{Note: select **2 Black** or **2 Grey** depending on the channel coding of the heads you are using for the phase 2 start and finish - both must be the same colour.}

- Press ↓ again so that **Phase 1 start:** is highlighted.
- Press ← or → until the **ch 1 s** is shown.

{You may select allowed times and fault rates for both phase 1 and phase 2 if you wish the timer to do the time faults calculation.}

Press **ENT**.

The timer will start phase 1 when the competitor crosses the start beam **if** the start gate is armed, otherwise the **START** button or **MEMORY** button (if memory is enabled) will start phase 1.

The timer will start phase 2 when the competitor crosses the intermediate beam **if** the start gate is armed, otherwise the **START** button or **MEMORY** button (if memory is enabled) will start phase 2.
*Phase two will not start if there are faults in phase 1 and **Bell mode:** in the main menu is set to **Auto**.*

Once phase 2 has started, the time for phase one will be displayed as the **LAST** time on the bottom left of the screen.

The timer will stop phase 2 when the competitor crosses the finish beam **if** the finish gate is armed, otherwise the **STOP** button or **MEMORY** button (if memory is enabled) will finish phase 2.

The information line at the top of the screen shows if **Phase 1** or **Phase 2** is being timed. If **Two Phase** is shown, the timer is waiting for phase 1 to start.

{On older timers, the finish 'Fault' lamp came on to indicate that the timer was waiting for phase 1 to start - this is no longer the case}

If the competitor has jumping or time faults in phase 1, they should not start phase 2. In this case press the **F:A** key to stop the timer and display the time for phase 1 (time includes penalties).

The countdown timer can be used in the same way as for normal Show Jumping competitions.

Faults and time faults can be entered and calculated separately for both phases.

Timing in Two Adjacent Rings

To time 2 two phase competitions in adjacent rings using wire-free heads, the C846 timer can be set so that phase 1 is **started** using a head set to the **finish** position. This is counter-intuitive but is the only way it can be done whilst retaining compatibility with older equipment.

You will need:

- 2 timers of which one must be a C840 or better - the other timer may be a C700, C830 or better.
- 6 heads, two of which must be of one colour channel and two of another colour channel. The channel of the remaining two does not matter.

If you do not have this equipment, you can either use wire connections to the heads (in this case the head must be switched off), or you can operate one or both rings using one or two gates, as described below.

Ring 1 - set the C840 or better timer as follows:

First make sure that you are in Show Jumping mode.

Press the **SET CLASS** key.

Press ↓ twice so that **Competition:** is highlighted.

Press ← or → until **Two Phase** is shown.

Press ↓ until **Gate channel:** is highlighted.

Press ← or → until **2 Green** is shown.

{Note: select **2 Black** or **2 Grey** depending on the channel of the heads you are using for the phase 2 start and finish.}

Press ↓ again so that **Phase 1 start:** is highlighted.

Press ← or → until the **Ch 1 F** is shown.

{note: this is different from the normal setting}

Press **ENT**.

Ring 1 - set the heads as follows:

Start gate to **CH1-F** *{this is not the normal setting}*

- the channel colour of this head does not matter.

Intermediate gate to **CH2-S**

Finish gate to **CH2-F**

- both these heads must have the same channel colour, which must be different from the channel of the intermediate and finish gates in ring 2.

Ring 2 - set the timer as follows:

Select two phase timing.

Set the gate channel to **2 Green**

{Note: select **2 Black** or **2 Grey** depending on the channel of the heads you are using for the phase 2 start and finish.}

- the precise way of setting the timer will vary, depending which model it is.

If a C846 timer is used make sure that **Phase 1 start:** is set to **Ch 1 S** (the normal setting).

Ring 2 - set the heads as follows:

Start gate to **CH1-S** (as normal)

- the channel colour of this head does not matter.

Intermediate gate to **CH2-S**

Finish gate to **CH2-F**

- both these heads must have the same channel colour, which must be different from the channel of the intermediate and finish gates in ring 1.

Using Only One or Two Gates

The start gate and the intermediate gate can be combined:

- Set the start/intermediate gate to **CH1-S**.
- Set the finish gate to **CH1-F**.
- Set the gate channel on the timer to **1**.
- Operate the timer exactly as you would if there were three heads.

{this only uses one radio channel, so a normal competition can be run in an adjacent ring using channel 2}

The intermediate gate and the finish gate can be combined:

- Set the start gate to **CH1-S**.
- Set the intermediate/finish gate to **CH2-S**.
- Set the gate channel on the timer to **2 Green**.
{or **2 Black** or **2 Grey** depending on the head}
- Operate the timer exactly as you would if there were three heads.

All three gates can be combined:

- Set the start/intermediate/finish gate to **CH1-S**.
- Set the gate channel on the timer to **1**.
- Operate the timer exactly as you would if there were three heads.

It is also possible to use two wire-free heads and a wired head:

- Set the start gate to **CH1-S**.
- Set the intermediate gate to **CH2-S**.
- Connect the finish gate to the timer by cable.
- Set the gate channel on the timer to **2 Green**.
{or **2 Black** or **2 Grey** depending on the head}
- Operate the timer exactly as you would if there were three heads.

Polo Timing

Polo mode times in minutes and seconds.

The clock is started and stopped using the **START** and **STOP** buttons on the timer. External start and stop and bell buttons may be connected to the remote socket on the back of the timer. The gates are not used.

The **ZERO** button sets the clock to 7 minutes (the timer must be stopped before it is zeroed). After the time has counted down to zero it starts to count up to 30 seconds, showing the letter E to indicate extra time. The buzzer sounds when the extra time reaches 30 seconds, or if the stop button is pressed in the extra time period. This can be relayed to the teams as a bell sound using a public address system if the **Bell mode:** is set to **Auto** (see page 19).

Scores:

- Home and Away scores can be displayed.
- Press the **S:H** or **F:A** buttons to increment the Home or Away scores respectively.
- Enter a number followed by **S:H** or **F:A** to set the Home or Away scores to that number. The scores are shown at the bottom of the screen and can be shown on a public display.

Public display. This always shows the elapsed time.

Slave display. This shows Home (left) and Away (right) scores.

Polo timing is selected using the **Mode:** option on the main menu (see page 19).

Marathon Timing

Marathon mode times in hours, minutes and seconds.

The public display can be set to show either hours, minutes and seconds (up to 9:59:59) or hours and minutes (up to 99:59).

The timer is usually operated manually using the **START** and **STOP** buttons. The **ZERO** button sets the timer to zero (the timer must be stopped first).

To synchronise the timer to another chronometer:

Press ↓ so that **Preset:** is highlighted near the bottom of the screen.

Enter the time in hours, minutes and seconds, using the numeric keys.

Press **ENT** when the external chronometer reaches the time you have entered. The C846 clock will start as soon as **ENT** is pressed.

To change the way the time is shown on the Public display:

Press ↓ twice, so that **Public display:** is highlighted near the bottom of the screen.

Press ← or → until the correct display option is shown.

Press **ENT**.

Public display. This always shows the elapsed time.

Slave display. This also shows the elapsed time

Marathon timing is selected using the **Mode:** option on the main menu (see page 19).

Countback Timing

Countback mode times backwards in hours, minutes and seconds from a preset time.

The public display can be set to show either hours, minutes and seconds (up to 9:59:59) or hours and minutes (up to 99:59).

The timer is usually operated manually using the **START** and **STOP** buttons. If the timer is stopped, the **ZERO** button sets it back to the preset time. The buzzer sounds when time counts down to zero. This can be relayed to the teams as a bell sound using a public address system if the **Bell mode:** is set to **Auto** (see page 19).

Scores:

Home and Away scores can be displayed.

Press the **S:H** or **F:A** buttons to increment the Home or Away scores respectively.

Enter a number followed by **S:H** or **F:A** to set the Home or Away scores to that number. The scores are shown at the bottom of the screen and can be shown on a public display.

To change the preset time:

Press ↓ so that **Preset:** is highlighted near the bottom of the screen.

Enter the time in hours, minutes and seconds, using the numeric keys and then press **ENT**.

To change the way the time is shown on the Public display:

Press ↓ twice, so that **Public display:** is highlighted near the bottom of the screen.

Press ← or → until the correct display option is shown.

Press **ENT**.

Public display. This always shows the elapsed time.

Slave display. This shows Home (left) and Away (right) scores.

Countback timing is selected using the **Mode:** option on the main menu (see page 19).

Time of Day Mode

The time of day is displayed on the screen (and on the public display) in hours and minutes. Seconds are not displayed.

If an optional temperature probe is connected to the socket on the rear of the timer, the time and temperature will alternate.

The time can be displayed in 12 hour or 24 hour format.

If 12 hour format is selected, temperature is displayed in °F.

If 24 hour format is selected, temperature is displayed in °C.

Time of Day mode is selected using the **Mode:** option on the main menu (see page 19).

Settings

To set the display format:

Press ↓ so that **Display:** is highlighted near the bottom of the screen.

Press ← or → until the correct starting option is shown.

Press **ENT**.

To set the date:

Press ↓ twice so that **Date (dd/mm/yy)** : is highlighted near the bottom of the screen.

Enter the date in day, month, year format, using the numeric keys. You must enter 6 digits.

Press **ENT**.

Note: the date cannot be displayed, but it is used when recording results, so it is important it is correct.

To set the time:

Press ↓ three times until **Time (24hr)** : is highlighted at the bottom of the screen.

Enter the time in hours (24 hour format), minutes and seconds, using the numeric keys. You must enter 4 digits.

Press **ENT**. This will start the internal clock.

Test Mode

This is useful for testing that public displays are working correctly.

Test mode cycles both the screen and public displays as follows: first all 0s are shown, followed by all 1s and so on up to all 9s. The display is then blanked, then shows 123.456
Then the cycle repeats.

Test mode is selected using the **Mode:** option on the main menu (see page 19).

Results

Results are available only for Show Jumping competitions.

For the recorded results to be meaningful you should:

Check that the date entered in the timer is correct (see page 12).

Enter a new class number for each class (see p 6).

Enter the correct allowed time and fault rate for each class and for each phase of a two phase competition (see p 6).

Enter the competitor number, jumping faults, and time penalties as the competition proceeds (see page 7).

In order to view the results, press the **RESULTS** key.

This show a list of the last 12 classes.

Press **↑** or **↓** to highlight the class whose results you wish to view.

Press **1** (or **ENT**) to see the first 12 competitors in rank order.

Press **2** to see the clear rounds. The **↑** or **↓** keys allow you to scroll through the list.

Press **3** to see all the results in competition order. The **↑** or **↓** keys allow you to scroll through the list.

Phase 1 times are not included in the list of competitors in rank order.

When you have finished, press **ENT** or **UNDO** to return to timing mode.

Gates

Setting Up

Attach the heads and reflectors to tripods and set at each side of start and finish lines (maximum distance of head from reflector is 30 metres, minimum is 5 metres). Push tripods into ground slightly, tighten leg locking-nuts to ensure that tripods are firm and point the reflector towards the head.

If wired heads are used, they are plugged into the back of the timer.

If wire-free heads are used, plug the aerial into the timer lid.

Set the timer to channel 1 using the menu.

Switch the head to **CH1-S** for the start gate, or to **CH1-F** for the finish gate. The **BATT** lamp should light - if not the head needs charging (you can still use it with a cable connection).

If there are two rings, set the timer to channel 2 and switch the heads to **CH2-S** and **CH2-F** for the second ring.

Align the head with the reflector - the **BEAM** lamp will go **out** to show correct alignment. Tighten all the screws and check the head is still aligned. The head must be carefully aligned and rock solid. The reflector does not need aligning.

Switch **OFF** when not in use to preserve the internal batteries.

Gate Channels

Different channels are available for wire-free heads - this allows several adjacent rings to operate without mutual interference.

The timer and both heads must be set to the same channel (different instructions apply for Show Jumping two phase competitions).

To set the timer channel, press menu, then press ↓ until **Gate channel1:** is highlighted. Press ← or → until the correct channel is selected, then press **ENT**.

The head channel is selected by the rotary switch on the back of the head.

Six different channels are available for channel 2. They are identified by the colour of the channel switch on the heads. Normally **Green** is used but **Black**, or **Grey** are available to order. Special heads are available with an additional switch to select **cxGreen**, **cxBlack** or **cxGrey**.

Channel 1 is the same for heads of all colour codes. Additional channel **1cx** is available on heads with the extra switch.

Gate Equalisation Delay

When using wire-free gates, you may notice a delay between the competitor breaking the beam and the timer responding.

This equalisation delay (of exactly 350 thousandths of a second) is deliberate.

The heads work in 'real time' mode, and transmit a digital signal to the timer that gives the exact time when the beam was broken. The timer then uses this information to correctly calculate the competitor's time.

The result of this complexity is that accurate timing is assured even at times of radio interference. Severe interference may cause communication to fail, but it cannot result in inaccurate times.

Less sophisticated systems that do not introduce such a delay cannot be relied upon, since their timing then may be affected by interference.

Charging and Battery Care

It is best to charge the heads 24 hours before **and** after each use.

You cannot overcharge.

Every 3 months the batteries should be fully discharged, and then recharged for at least 24 hours. This should be done even when the equipment is not used (in winter for example).

Also see page 17.

Troubleshooting

Heads cannot be aligned:

Ensure the head lenses and the reflectors are clean and dry.

Ensure the head lenses and reflectors are free from mist. If they are prone to misting, ensure that they are stored at the same temperature as that at which they will be used.

Ensure the head and reflector are no further than 30 metres apart and **that they are no closer than 5 metres** (the heads will not focus at shorter distances).

In heavy rain it will be necessary to have the head and reflector closer than 30 metres.

Heads can be aligned but they then go in and out of alignment:

Ensure the fixing nuts on the head and tripod are secure. It is very important that the head does not move or wobble about.

If the head wobbles on the tripod, even with the fixing nut secure, then the mounting bracket may be distorted where it meets the tripod. This can happen when the head has been kicked over a number of times. In this case the bracket must be removed and re-shaped by tapping the face that meets the tripod with a hammer until it is flat or slightly concave.

Fault lamp on timer is lit:

Ensure head is switched to the same channel as the timer.

Ensure the timer aerial is plugged into the socket on the timer lid.

Ensure head is not too far from receiver (a maximum of 200 metres max. in good conditions).

Remove the aerial from the timer and use a short television aerial extension lead so that the aerial can be mounted outside, above the Judge's box and well away from any metalwork.

Fault lamp on timer flashes:

Ensure no two heads have the same switch position.

If the fault persists, use a cable connection as there may be bad radio interference. If the problem occurs at different sites, the switch may be damaged. The head must be returned for repair (see page 27).

Batt. lamp on timer flashes:

Batteries are low but you may have up to two hours of use.

If the batteries run down you can still use the head with a cable connection to the timer, or you can connect an external 12 volt battery to the cable socket using the battery lead supplied with the timer.

Head will not switch on:

The batteries may need charging. Fully discharged batteries should be charged for 48 hours.

The switch may be damaged or the batteries may be faulty. The head must be returned for repair (see page 27).

Note that the head is an optical instrument and will need realignment if opened. Do not attempt to replace head batteries yourself.

Head will not switch off:

The switch is damaged. The head must be returned for repair (see page 27).

Public Displays and Accessories

Remote Buttons

Remote **START**, **STOP**, **BELL** and **COUNTDOWN** buttons give the course judge as well as the timing judge control of the timing.

The button console is connected to the remote socket on the rear of the timer.

A version with a built-in time display is available.

{these are sometimes referred to as FEI buttons}

Public Displays

Various sizes and types of display are available for relaying the time to the competitors and spectators. See our brochure or website for further details.

A number of displays can be connected together to give visibility over a wider area.

Power: The displays require power from a 12 volt battery, or from the mains using a power unit. The power unit should be mounted indoors and **must not** be allowed to get wet.

Warning: The battery lead, or the lead from the power unit to the display must not be extended or the display will not work properly. The battery or mains supply must be within 3 metres of the display.

Signal: The display is normally connected to the timer by cable. 10 metres is supplied as standard but may be extended to several hundred metres.

A radio link with a range of up to 100 metres is available as an option.

Printer

A printer can be connected to the timer.

It operates only in Show Jumping mode, and prints a tally roll slip for each competitor, showing the competitor's number, total time, time faults added, total faults and time faults.

To enable the printer output:

Press menu.

Press ↓ until **Serial port:** is highlighted.

Press ← or → until **Printer** is shown.

Press **ENT**.

If you wish to use your own printer it must have an RS232 serial input set to 2400 baud.

Power, Batteries and Charging

Switching On

Press **ZERO** to switch the timer on.

Switching Off

When the timer is switched off some data is lost (fastest time and last competitor time for example).

The timer will go into power-saving standby mode automatically after a period of inactivity. If the timer is running on its internal batteries, the display backlight will go off after only 15 seconds (the light uses a lot of battery power).

The timer will switch out of standby immediately if a beam is broken or if any button or key on the timer is pressed.

Press **OFF** (top left key on the keypad) to switch the timer off.

Power

If you are using the internal batteries you should have an alternative source of power to hand in case the batteries run down.

The timer can be powered from the mains using the charger , or it can be powered from an external 12 volt battery. An external battery will not recharge the internal batteries.

Charging and Battery Care

- charge overnight before **and** after each show
- charge overnight every 3 months when not in use
- every year, charge for 48 hours. Then test the batteries as follows:

C846 timer - disconnect the charger. Switch the timer on, making sure the timer is zeroed. Leave for 16 hours. If the timer is still on, press zero to light the display. If the 'low battery' warning is not showing, then the batteries are in good condition. Leave the timer on until it is fully discharged. Then switch off and recharge for 48 hours.

K531 heads - disconnect the charger. Switch the heads on and leave on for 24 hours. If the head is still on without the 'low battery' warning showing, then the batteries are in good condition. Leave the head on until it is fully discharged. Then switch off and recharge for 48 hours.

After being fully discharged, batteries will take 24 to 48 hours to fully recharge.

Estimated battery discharge times from fully charged:

C846 timer:	15 hours	standby mode
	9 hours	running, brightness at minimum
	5 hours	running, brightness at maximum

K531 head: over 24 hours

Menus

Some menus simply prompt for one of a number of keys to be pressed.

Other menus offer a list of items of which one is highlighted.

You then press ↑ or ↓ to highlight the item you want to change.

If the item requires a numeric value, key it in and press ↑ or ↓ again, or press **ENT** to set the value.

For other items, press ← or → until the desired option is displayed.

When you are satisfied with the changes, press **ENT** to record the changes and exit the menu.

If you make a mistake, press **CLR** to exit the menu without making any changes.

'Welcome' Menu

To display the Welcome Menu: press **MENU** then press **CLR**.

The timer has many advanced features, but it has been designed so that you can ignore them if you wish to do basic timing.

A **Welc**ome menu appears when you first switch the timer on. This offers the option to program the timer for some common timing tasks with a single keystroke, without having to worry about the more complicated menus. Novice users are advised to press the **1** key, which will program the timer for standard Show Jumping timing.

List of All Menu Options

Here is a list of all the menu items and the available options:

Main Menu

To display the Main Menu: press **MENU** (the main menu cannot be displayed when the results are being viewed).

Main Menu Item	Available Options
Timing mode:	Show Jumping Polo Marathon Countback Time of day Test
Gate channel:	1 2 Green 2 Black 2 Grey 1cx 2cxGreen 2cxBlack 2cxGrey
Gate memory:	Off 5s 10s 20s
Public display:	Time Comp/time {shows competitor number until timing starts}
Slave display:	Time Comp/time {shows competitor number until timing starts} Fastest {shows fastest time - includes time penalties} Comp/faults {shows competitor number and jumping faults}

(the options for public display and slave display apply only to Show Jumping. In other modes what is displayed is fixed - see each mode's instructions for details)

Bell mode: Normal
Auto

(this setting must be made after setting the timing mode, which resets it)

Bell sound: Slow bell
Fast bell
Ding-dong
Bullhorn
Siren
Warble
Whoop
Tone

Bell output: Mic
Line
Relay

Serial port: Computime
Printer

Set Class Menu - Show Jumping

To display the Set Class Menu: press **SET CLASS** (this menu only applies to show jumping and can only be reached if the show jumping timing screen is being viewed).

Menu Item Available Options

Class: {key in the class number}
Round: R1
R2
JO1
JO2
JO3
JO4
JO5
JO6
Competition: Normal
45s topscore
60s topscore
Two Phase
Countdown: Off
45s
Off: +penalties } added time (time penalties)
45s: +penalties } are added to the displayed time
Allowed time: {key in the time}
(this is called Phase 2 time for 2 phase competitions)
Fault rate: 1 per 4 sec
1 per sec
Resolution: 1/100 s
1/1000 s
Gate channel: {this is the same setting as in the main menu}

These items only appear for two phase competitions:

Phase 1 start: Ch 1 S
Ch 1 F
(this setting is cleared when the competition is changed)
Phase 1 time: {key in the time}
Phase 1 rate: 1 per 4 sec
1 per sec

Settings Menu - Marathon

To display the Settings Menu: Press any arrow key when the Marathon timing screen is displayed - the following items are displayed at the bottom left of the screen:

Preset: {key in the time}
Public display: h:mm:ss
hh:mm

Settings Menu - Countback

To display the Settings Menu: Press any arrow key when the Countback timing screen is displayed - the following items are displayed at the bottom left of the screen:

Preset: {key in the time}
Public display: h:mm:ss
hh:mm

Settings Menu - Time of Day

To display the Settings Menu: Press any arrow key when the Time of day timing screen is displayed - the following items are displayed at the bottom left of the screen:

Display: 12hr/°F
24hr/°C
Date(dd/mm/yy): {key in the date - 6 digits must be entered}
Time {24hr): {key in the time - 4 digits must be entered}

Controls and Indicators

Timer Base

ZERO	Used to turn the timer power on. Sets the timer to zero <i>if it is stopped</i> . You cannot zero the timer when it is running or in time of day or test modes. When this button is pressed the screen will switch on if it has gone blank (standby mode).
START	Starts the timer manually. In Show Jumping countdown mode if the countdown is stopped, this re-starts the countdown. If the countdown is running, this cancels the countdown and starts the course time (from zero). In Show Jumping two phase mode, if phase 1 is stopped, this re-starts phase 1. If phase 1 is running, this starts phase 2. In Time of day or test mode, this has no effect.
STOP	Stops the timer manually. In Time of day or test mode, this has no effect.
MEMORY	If the start or finish line is crossed with the gate not armed this button can allow correct timing to be obtained (see page 3).
START GATE	Pull the switch towards you to arm (prime) the start gate. Push the switch away you to disarm the start gate. The switch springs back to the centre position when released. In some modes once the timer has started or a button is pressed, the gate disarms automatically.
FINISH GATE	Pull the switch towards you to arm (prime) the finish gate. Push the switch away you to disarm the finish gate. The switch springs back to the centre position when released. In some modes once the timer has stopped or a button is pressed, the gate disarms automatically.
START BEAM	Lights when a competitor passes the start beam or if the start gate is absent or not aligned.
START SET	Lights when the start gate is armed.
FINISH BEAM	Lights when a competitor passes the finish beam or if the finish gate is absent or not aligned. For single gate operation the finish beam lamp is on continuously.
FINISH SET	Lights when the finish gate is armed.

Keypad

OFF	Switches the timer off.
DISP ON	Turns on both the public display and slave display if they have been turned off.
DISP OFF	Turns off both the public display and slave display.
FAST OFF	Turns off the slave display if it is showing the fastest time.
RESULTS	Displays the list of dates and class numbers for which results are available (not all modes record results).
SET CLASS	In Show Jumping mode, displays the class settings menu. Has no function in other modes.
RET	In Show Jumping mode, marks a competitor as having been eliminated.
ELIM	In Show Jumping mode, marks a competitor as having retired.
MENU	Displays the main menu.
S:H	In Show Jumping mode, sets the lead (fastest) time. In Polo and Countback modes, sets the home score.
↑	Move up the list of menu items.
F:A	In Show Jumping two phase mode, sets the display to the phase 1 time and stops the timer (used if there are faults in phase 1). In Polo and Countback modes, sets the away score.
BELL	Operates the built-in electronic bell (see page 3). In Show Jumping mode, if the timer is zero and countdown is on, this starts the countdown timer.
←	Scrolls backwards through the list of options for the highlighted menu item.
↓	Move down the list of menu items. In some modes this displays a settings menu specific to that mode near the bottom left of the screen.
→	Scrolls forwards through the list of options for the highlighted menu item.
0 to 9	Used to enter numeric data into the timer.
CLR	In menu mode, displays the welcome menu, enabling common competition types to be programmed with a single keypress. If pressed just before S:H , F:A , ADD TIME , FAULTS or ENT , home or away scores, fastest time, time penalties, faults, competitor number are set to zero, as appropriate.
ADD TIME	In Show Jumping mode, adds the previously entered number to the competitor's time penalties (in some timers the key is labelled TIME PEN).
FAULTS	In Show Jumping mode, adds the previously entered number to the competitor's jumping faults.
UNDO	In menu mode, clears the menu from the screen without changing any settings. In Show Jumping mode, cancels the last change to the competitor number, faults or penalties.
—	{reserved for future development}
ENT	In menu mode or if a settings menu is displayed, accepts and stores any changes that have been made and clears the menu or settings from the screen. In Show Jumping mode, makes a previously entered number the competitor's number.

Buzzer

This sounds whenever one of the buttons is pressed and performs a function (but not, for example, if the stop button is pressed with the timer stopped).

Except in time of day and test modes, a longer note sounds whenever a gate beam is crossed.

In some modes, a tick sounds whenever the timer is running. A different tick sounds if the Show Jumping countdown is running.

Different warning sounds alert you if the timer lid is closed with the timer switched on, or if the bell is pressed to start the Show Jumping countdown without first zeroing the timer.

There is a volume control is near the display screen.

Timer Lid

- BRIGHTNESS** Sets the brightness of the screen illumination.
Should be turned to minimum for increased battery life.
- CONTRAST** Adjust this for best screen visibility.
- VOLUME** Sets the volume of the warning buzzer and 'tick'
- START BATT** Flashes if the battery in the start head needs charging.
- START FAULT** Lights if there is no radio reception from the start head.
If you are not using a wire-free start heads it will light continuously.
Flashes if there is radio interference or if two heads are set to the same channel position.
- FINISH BATT** Flashes if the battery in the finish head needs charging.
- FINISH FAULT** Lights if there is no radio reception from the finish head.
If you are not using a wire-free start heads it will light continuously.
Flashes if there is radio interference or if two heads are set to the same channel position.

Heads

- BEAM** Lights if the head is powered and the beam is not aligned.
- BATTERY OFF** In this position the battery is switched off. The head will still work if it is connected to the timer by wire.
- CH1 - S** Switches the head start on channel 1.
- CH1 - F** Switches the head finish on channel 1.
- CH1 - S** Switches the head start on channel 2.
- CH1 - F** Switches the head finish on channel 2.
- BATT** Lights when the unit is switched on.
It flashes if the batteries need charging (there may be one or two hours use left).
- CHARGE** Lights if the charger is connected and powered.
- CHARGE SOCKET** The charger plugs into this socket.
- 3 PIN PLUG** Enables the head to be connected to the timer by wire.
If the head battery is discharged an external 12 volt battery may be connected (using the battery lead supplied with the timer) to power the head for wire- free operation.

Connectors

AERIAL A rubber aerial is clipped inside the lid. Insert it into the socket in the right hand edge of the lid if wire-free gates are to be used.
Do not lose the aerial as replacements are expensive.
An aerial extension cable is available for use if reception is poor.

Rear of timer

REMOTE Connection for a remote start, stop, bell and countdown start buttons (sometimes called FEI buttons) and optional repeat display.

FINISH Finish gate socket (if wired heads are used).

START Start gate socket (if wired heads are used).

RS232 Computer or printer connection.

SLAVE Slave display for relaying information to the competitors/spectators.

DISPLAY Main public display for relaying information to the competitors/spectators.

TH Connection for a thermometer probe for displaying temperature in Time of day mode.

12V For powering the timer from an external 12v battery.

BELL Electronic bell output for a public address amplifier.
May be set to operate a conventional bell (24V dc, 0.5A maximum rating).

CHARGE Connection for the charger. The red lamp lights when the timer is being charged.
The charger can also power the timer.

Troubleshooting and repairs

GUARANTEE: We have a 12 month guarantee which offers repair without charge for parts or labour.

We do not offer on-site repair and it is the customer's responsibility to return faulty equipment to our works. The guarantee does not cover items that have been damaged. We will not accept responsibility for consequential loss of any sort (including hire charges). If timing is critical to your event you should ensure that spare equipment is available.

FOR GUARANTEE CLAIMS: Ring NSR Ltd on 01923 209640

FOR OTHER REPAIRS: Ring PAS Ltd on 01392 270780

The following troubleshooting guide may resolve your problem without returning items.

Will not operate on internal batteries:

Batteries may need charging - use an external battery or mains power unit.

See page 17 for battery testing, and for battery life.

Wire-free heads will not work - start/finish fault lights are on:

Check the timer aerial is correctly fitted into the socket on the outside of the lid.

Check that the timer channel setting corresponds to the channel of your heads (see page 14).

Check that the 'Phase 1 start' setting is Ch 1 S (see page 20).

Check the head battery lights are on.

Check the head aerials are not damaged.

Remove the aerial from the timer and use a short television aerial extension lead so that the aerial can be mounted outside, above the Judge's box and well away from any metalwork.

Heads cannot be aligned:

Ensure the head lenses and the reflectors are clean and dry.

Ensure the head and reflector are no further than 30 metres apart and **that they are no closer than 4 metres.**

See additional advice on page 14.

Heads go in and out of alignment:

Ensure the fixing nuts on the head and tripod are secure.

If the head wobbles on the tripod the mounting bracket may be bent where it meets the tripod. Remove the bracket and hammer it flat.

Batteries do not seem to last long on one charge:

Ensure brightness is set to minimum.

If the timer is a C830 model, have it upgraded to model C845.

The public display is blank but the decimal point flashes:

The external battery is discharged.

The lead from the display to the battery or mains power unit has been extended - it must not be more than 4 metres.

The public display shows a horizontal bar:

The external battery is discharged.

The lead from the display to the battery or mains power unit has been extended - it must not be more than 4 metres.

The public display is wrong:

Use the test mode (see page 12) to note down the exact problem, then telephone for advice.

Two phase competitions do not correctly start after a countdown timeout:

You have an older timer, have the software upgraded.

The printer does not work correctly:

You have an older timer, have the software upgraded.

In two phase, an 'E' shows and phase 2 wont start:

You have an older timer, set the phase 1 time to zero.

Have the software upgraded.

Glossary

Italics indicate that a word or phrase is explained elsewhere in the glossary.

↑	The up arrow key on the keypad.
↓	The down arrow key on the keypad.
←	The left arrow key on the keypad.
→	The right arrow key on the keypad.
Added Time	This is an FEI expression meaning <i>time penalties</i> .
Aligned	Means that the <i>head</i> position has been adjusted so that the <i>beam</i> accurately returns from the reflector into the head (see page 14).
Armed	Before a gate can start or stop the clock it must be <i>armed</i> (or <i>primed</i>). In some timing modes the gates are automatically disarmed after they have triggered the clock. See details of each timing mode for specific information.
Beam	This refers to the infra-red beam that marks the start and finish lines. When the <i>beam</i> is broken by a competitor passing, the clock is triggered. This is also used as another name for the <i>gate</i> .
Clock	In these instructions <i>clock</i> refers to the internal function that counts time. This should not be confused with a <i>time of day</i> clock. <i>Timer</i> is used to refer to the equipment.
Countback	A timing mode in which the timer counts down from a pre-set time that can be changed (used for football or basket ball, for example). Used to be called 'countdown' but has been renamed to avoid confusion with the Show Jumping <i>countdown</i> timer.
Countdown	In Show Jumping, this is the 45 second period after which the main timer starts even is the competitor has not crossed the start beam. Not to be confused with the <i>countback</i> mode.
Display	May refer either to a <i>public display</i> or the display <i>screen</i> on the <i>timer</i> . To avoid confusion the word is not used on its own in this booklet.
Equalisation	A function in <i>wire-free heads</i> that ensures timing is not affected by radio interference (see page 14)
Faults	Jumping faults are incurred for errors made during a round. In FEI usage, 'fault' is used to mean the error itself - the word <i>penalties</i> is used to indicate the number of points added.
FEI buttons	A term sometimes used to refer to the <i>remote</i> start/stop console (see page 16).
Gate	This is the equipment that provides the <i>beam</i> . It normally consists of a <i>head</i> that produces and detects the infra-red beam and a reflector that returns the beam to the head, both mounted on tripods. See page 14 for more details.

Gate memory	A function within the <i>timer</i> that enables a correct time to be obtained even if the <i>gates</i> are not <i>armed</i> when a competitor passes the start or finish. See page 3 for more details.
Head	The active part of the <i>gate</i> . It signals to the <i>timer</i> (either by wire or by radio) when a competitor crosses the start or finish.
Memory	This may either refer to the <i>gate memory</i> or to the store inside the timer that saves the results.
Mode	The specific type of competition or other function that the timer is programmed to time. See page 19.
Penalties	This is an FEI expression meaning <i>faults</i> .
Primed	Synonym for <i>armed</i> .
Public display	An external unit that shows the time or other information to the competitors/spectators.
Remote console	A unit containing start/stop/bell/countdown buttons (see page 16).
RS232	The socket on the rear of the timer for connection to a computer or printer. Also known as ‘serial port’ or ‘COM port’.
Screen	The display within the <i>timer</i> .
Slave display	An secondary <i>public display</i> that can show additional information.
Standby	Power saving mode in which all data is retained and which allows the timer to respond instantly to any start or stop signal.
Time of day	Real time. This should not be confused with <i>clock</i> .
Time faults	Faults added for exceeding the allowed time. In FEI usage these are called <i>time penalties</i> .
Time penalties	The number of seconds added when a disobedience results in obstacle displacement. In FEI usage this expression means the score incurred for exceeding the allowed time (see <i>added time</i>).
Timer	In these instructions <i>timer</i> is used to refer to the equipment. <i>Clock</i> refers to the internal function that counts time.
Welcome menu	A message on the <i>screen</i> enabling common types of competition to be programmed with a single keypress.
Wire-free	Used to indicate that the <i>heads</i> signal to the <i>timer</i> by radio rather than by wire.