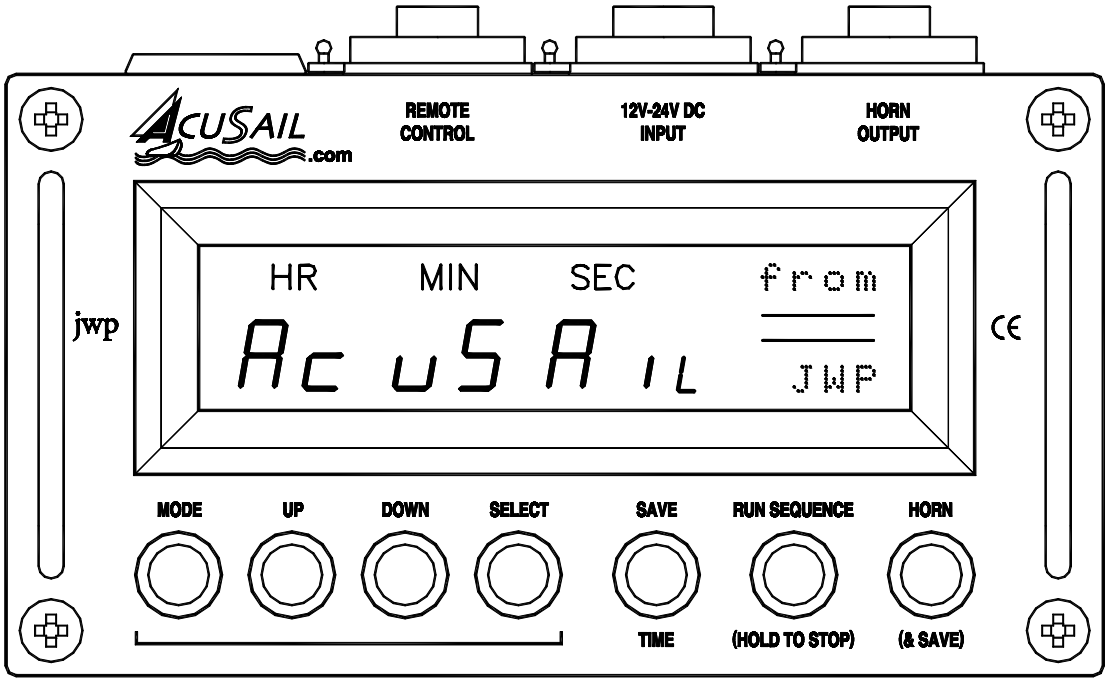
User Manual



Manual Version: 2.05

Software Date: 03/05/18

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What Should I Read?

This manual is divided into three main sections together with an appendix. Each section covers the features offered by **AcuSail** to a different depth.

Everyone should at least read Section 1, which is aimed at the basic user, or those who don't want (or need) to have an in-depth understanding of all the possibilities **AcuSail** can provide.

Having read this short section, you should understand how to get the unit up and running with the minimum of fuss and be able to start races with ease.

If you then wish to expand your knowledge (to cover the memory functions and other operational facilities of the product) you should read Section 2, which is aimed at Advanced Users.

Once you have digested this additional information you will understand how **AcuSail** saves timing data and how to retrieve and understand it (either locally or from a PC), as well as how to select different starting sequences from those pre-programmed in memory and how to perform Recalls etc.

Anyone interested in programming timing sequences or configuring the unit to suit particular club preferences, should also read Section 3, which is intended for perhaps only one individual per club, who will then be responsible for customising the product configuration. We will later refer to this individual as *'Club Programmer'*.

The appendix covers technical details, such as connector pin-outs, wiring details, file transfer protocols and the product specifications. Whoever will be responsible for the external connections to the unit (particularly the first time the product is used) will need to refer to this information.

Section 1 – Basic Operation

If you don't have the unit with you whilst reading this document, you may find it useful to refer to the drawing on the front of this manual to clarify the text.

Connecting the Unit

All the **AcuSail** connectors are fully waterproof. Each socket is polarised, so you will need to correctly align the locating lug on the cable connector to the one on the box. Once this is done, simply push the connector fully home and then rotate the outer ring so that the rubber seal is compressed. Reverse the procedure to remove the connector.

You must tighten the connectors to compress the rubber seal in order to ensure that all the connections are fully waterproof.

The *Remote Control* socket has a protective cap that unscrews in a similar manner to the connector outer rings. Do not remove this cap (leaving the connector exposed) unless you intend to connect something to this socket.

Assuming that your club has a typical unit configuration, **AcuSail** requires just two connections to the outside world to get the unit up and running (non-standard configurations, where high-powered horns are fed via the optional relay unit or from a separate battery, are detailed in the appendix).

Start by plugging the battery into the *12-24v DC Input* and then plug the external horn(s) into the *Horn Output*.

In addition to the two main connections you may have ancillary devices (remote switches or a PC connection for example), which should be connected to the *Remote Control* socket. This connection is optional; **AcuSail** is fully functional without these extra additions.

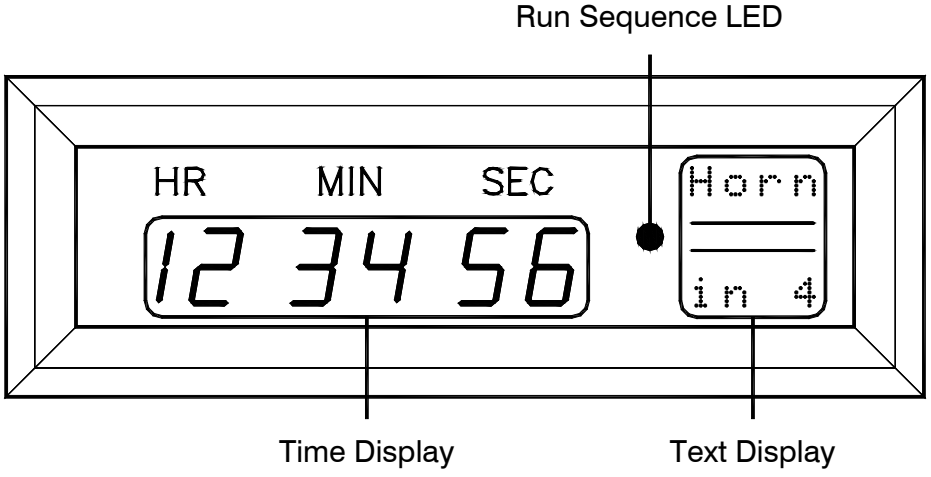
As soon as **AcuSail** is connected to a battery, it will display a product sign-on message, followed quickly by the unit's unique serial number and then the date of the current software version. This software date is then used as the starting point for setting the actual date.

If the software date of your unit does not match that shown on the front of this manual, you may find that the product performs certain functions in a different manner to detailed here (or may indeed be missing other features altogether). If this is the case, please do not hesitate to contact **jwp,** *for an upgrade to the latest firmware (that's the software running inside the product)***.**

If you are uncomfortable with upgrading your unit 'in the field' (or perhaps do not own the optional serial cable needed to facilitate this) please contact **jwp** *for more specific assistance*.

Understanding the Display

The display has three main parts;



Times are always shown in the *Time Display* area, although occasionally (whilst setting the date for example), this area is used for other functions.

The *Run Sequence LED* illuminates constantly whenever a start sequence is running and then changes to flashing every second when a Race is 'Live' (with the events being logged).

The *Text Display* area is used for user prompts and general messages.

Setting the Date

Note that setting the correct date IS important (even though it may initially seem unnecessary), as **AcuSail** *uses it as a means of grouping saved timing events together (as Race Days) for later recall.*

This process requires you to set three, two-digit values.

As soon as the unit has completed its power up sequence, you will be prompted to *'Set Year',* with the relevant digits flashing to indicate the current value.

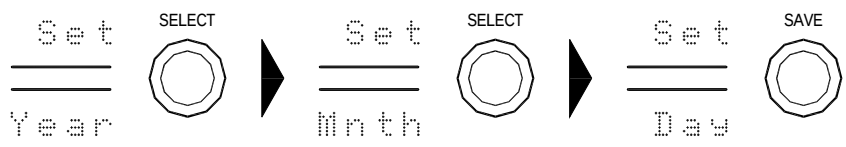
Use the *Up* and/or *Down* button to adjust the Year (if necessary). Holding either button will cause the value to change repeatedly. Holding both buttons together will increase the repeat rate (the first held button determines the direction of change).

Once you have set the correct year, press the *Select* button to move to '*Set Month*' and repeat the process and, when you are ready, once again to '*Set Day'*. Pressing Select a further time (from '*Set Day'*) will loop you back around. Repeat the setting procedure until you have the date right.

Invalid days (for any month/year and with due consideration for leap years) are changed to the nearest valid number (if you change the month/year after setting the day). I.E. you cannot set dates that do not exist.

To exit the procedure at any point (and move to setting the time) press the *Save* button. **AcuSail** will beep to confirm the date is stored. Once stored, the only way to change the date is to remove the battery supply.

This graphic summarises the date setting procedure:



Setting the Time

Setting the time, like the date, requires you to set three, two-digit values.

You will first be prompted to *'Set Hrs'* with the relevant digits flashing to indicate the current value.

As before, use the *Up* and/or *Down* button to set the desired value. Holding either button will cause the value to change repeatedly. Holding both buttons will increase the repeat rate (the first held button determines the direction).

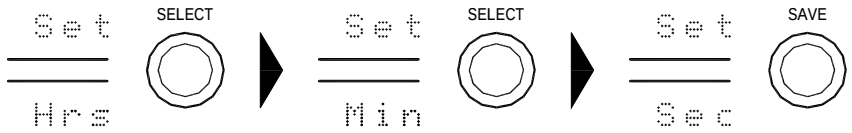
Once you have set the desired hour value, press the *Select* button to move to *'Set Min'*. Repeat the setting procedure to set the desired minute.

Finally, press the *Select* button again to move to *'Set Sec'* and set the desired value for seconds.

If you press the *Select* button once more, you will move back to *'Set Hrs',* allowing you to loop around the entire setting procedure, until you are happy with the displayed time. You can also use the *Mode* button, to move in the opposite direction across the display (should that be quicker).

At any point, when the time you have set matches the real time, press the *Save* button to start the clock running**. AcuSail** will beep to confirm the time is stored and the clock will start immediately.

This graphic summarises a typical time setting procedure:



If you are subsequently unhappy with how well the **AcuSail** time display matches the real time (say for example because you pressed the *Save* button late), simply hold the *Save* button for at least three seconds, which will cancel the clock and allow you to repeat the setting procedure. Note that this function is automatically disabled once you have run any sequence.

To stop inadvertent clock resetting prior to a race start (I.E. before any sequence has been run), your Club Programmer may have disabled the 'hold to reset' ability of the Save button. If this is the case, you will have to unplug the unit from the battery and start the whole process again.

Running a Sequence (to Start a Race)

Once the clock is running, you can choose to start a sequence at any time.

Sequences always start with a beep countdown (typically of ten seconds, but ultimately dependent on exactly how they have been pre-programmed), and are nearly always synchronised with the next whole minute.

While **AcuSail** *allows you to set-up and indeed run sequences that are not synchronised to the next whole minute, (so will just start a number of seconds after you run them), we STRONGLY recommend that the unit is NOT used in this manner. The following description assumes your Club Programmer will follow this advice (and our best practice), and that your sequences are ALL pre-programmed as 'Auto' starts…*

In order to start a sequence on the required minute, there is a 'window' during which you need to press the *Run Sequence* button. This is best illustrated by a specific example;

Let's say you wanted to start a sequence at 11:00.00 and it has been pre-programmed with a beep countdown of ten seconds…

To achieve this, the *Run Sequence* button would need to be pressed at some point between 10:58.50 and 10:59.49. Any earlier would start the sequence at 10:59.00, whilst any later would result in a start at 11:01.00.

The easiest way to visualise this is to remember that you will start a timing sequence on the next minute if you press the *Run Sequence* button at least one second before it's beep countdown is due to start.

Once you press the *Run Sequence* button the *Run Sequence LED* will light. **AcuSail** will beep to confirm acceptance of the operation and display details of the upcoming sequence for a short time.

The top line of the text display shows the sequence number in the form '*SeqX*', where *X*=1-8 (**AcuSail** has eight user-programmable sequences to choose from). The bottom line contains a user-programmable name for the sequence, intended purely as an aide-memoir.

At the correct time the sequence will automatically start, with **AcuSail** counting down to the first horn (the countdown will precede the first event so that the horn will occur exactly at XX:XX:00). In addition to the visual countdown, each second is punctuated with an audible beep.

At the first event in the sequence (typically a Class Horn), **AcuSail** will start logging. From this moment on (until the race is manually stopped), any sequence event, or indeed a manual *Horn*/*Save,* will be recorded to memory.

Once a sequence has completed, The *Run Sequence LED* will change from steady state to flashing. This serves to show that the start(s) are over, a Race is in progress (so 'Live'), as well as indicating that **AcuSail** is logging all events.

Stopping a Sequence

AcuSail can run both infinite loop sequences (where, once started, a particular set of events is repeated continually until the user intervenes) and set length sequences (where, once all the events have been completed, the sequence comes to an end on its own).

Irrespective of the sequence type, you can, of course, manually stop a sequence at any time. To do this, simply hold the *Run Sequence* button for at least three seconds.

Depending on how **AcuSail** *is configured, you may be asked to confirm this decision with a further 'Yes/No' question (answered using the Up, Down and Select buttons).*

Once the button has been held for long enough (*or, if so configured, the additional confirmation has been made*), **AcuSail** will beep, cancel the sequence and display the current sequence number (*SeqX*) together with *'STOP*'.

Note that, if the sequence has been cancelled before any Class Start has happened (so no boats are away), the Race will be deemed to have been aborted/stopped. **AcuSail** will show 'Race STOP' in this situation.

Don't forget that the *Run Sequence LED* is a helpful aide memoire with regard to status; Solid Lit means a sequence is running, flashing means the sequence is over with a Race running, Off means idle.

Stopping a Race

Once a race is over, it is important to stop **AcuSail** logging further events and possibly causing confusion when your race data is later processed.

To do this, simply press and hold the *Run Sequence* button AND the *Select* button TOGETHER for at least three seconds.

Depending on how **AcuSail** *is configured, you may be asked to confirm this decision with a further 'Yes/No' question (answered using the Up, Down and Select buttons).*

Once the button has been held for long enough (*or, if so configured, the additional confirmation has been made*), **AcuSail** will beep, cancel the Race and will show '*Race STOP*'. The *Run Sequence LED* will turn off. If you have been using the unit in '*Stopwatch*' mode (where race times are referenced to zero as opposed to '*Time of Day'*), the time display will return to the clock.
From this point on, **AcuSail** will no longer log anything until the next race.

Sounding Manual Horns

You can sound a manual horn at any point by pressing the *Horn* button.

Depending on how your Club Programmer has configured **AcuSail***, you may find that a short button press will generate a blast of one length, while holding the button for longer (just less than a second), will generate a longer blast.*

In either case, (I.E. whether or not dual durations have been set), the time signal length(s) are a fixed duration (as per your Club Programmer's choice) and the horn will only retrigger once you release and then re-press the button.

Note that holding either the *Horn* or the *Save* button for longer than three seconds has an additional function, which is detailed later under '*advanced operation*' and should be avoided unless specifically required.

Just so you know, when a race is not in progress (I.E. typically during setup), if/when you press the button(s) to test them, **AcuSail** will display the preset timing duration(s) assigned to the *Horn* and (if it's been assigned) the *Save Time* button too. Once a sequence is started, captured timing events are displayed instead (see 'Saving Times' below).

If your Club has an optional external Horn and/or Horn/Save button(s) remote control (which is connected via the *Remote Control* socket), it will function in an identical manner to the one on the main unit (as long as it's enabled).

Section 2 – Advanced Operation

Individual Recalls

As long as your Club Programmer hasn't disabled the functionality and Start Horns have been correctly identified within a given sequence, Individual Recalls are a semi-automated process.

If you press the *Horn* button within ten seconds of a Race Start, it is assumed that you are making an Individual Recall.

AcuSail will then do the following…

- A suitably spaced additional Horn will be added (assuming you've pressed for the recall while the Race Start Horn is still sounding, or before an appropriate silence has elapsed).
- A '⬅IR⬅' (Individual Recall) time will be saved to the memory.
- The Individual Recall light configuration will be set.

The Individual Recall light configuration will remain in place until the next event (be it a manual Horn / Save or indeed another sequence event) occurs.

General Recalls

As long as your Club Programmer hasn't disabled the functionality and Start Horns have been correctly identified within a given sequence, General Recalls, like Individual ones, are also semi-automated.

If you press AND HOLD the *Save* button and THEN press the *Horn* button (without releasing *Save*), all within ten seconds of a Race Start, it is assumed that you are making a General Recall.

AcuSail will then do the following…

- Suitably spaced additional Horn(s) will be added (based on when you pressed in relation to the Race Start Horn).
- A '⬅GRX' (General Recall, Start #X) time will be saved to the memory.
- The General Recall light configuration will be set.

Additionally (and only if **AcuSail** is configured this way), an additional 'Recall' sequence may then be tagged on to the end of the currently running sequence, thus extending it, to deal with a Class Recall (in effect you can add another Start to the end of a block of Starts). This 'GoTo' is optional and is down to the way the *Club Programmer* has configured the unit to operate.

Within this scheme, it is entirely possible that each 'main' sequence your club uses, can have a different, but associated, 'Recall' sequence (if necessary). The overall limit to sequences available (however they are used) is eight.

If you are running a multi-Start sequence, **AcuSail** further intelligently evaluates the Recall request, handling it differently depending on where you are within the sequence;

- Any aborted mid-sequence Start, will automatically add a 'Recall Sequence' to the end of the currently running one, synchronised such that the last Horn (i.e. the last Start) of the current sequence, will appear as if it's the appropriate 'first' Horn of the added 'Recall Sequence'; In essence, the 'link' to the 'added' sequence will be totally transparent, and it will just seem that you are running one more Start.

- With the very last Start of any sequence, the 'Recall Sequence' is run in full, synchronised with the next minute. This allows additional time for the boats to re-group, which isn't needed post a mid-sequence aborted Start (because there will already be more Starts still to go).

The General Recall light configuration will remain in place until the next event (be it a manual Horn / Save or indeed another sequence event) occurs.

Manually Cancelling Recall Lights

Should you wish to manually cancel any lights that have been automatically turned on (to indicate either an Individual or General Recall), simply press the *Select* button. **AcuSail** will beep to acknowledge your action and then return the lights to the underlying status (i.e. as per the current step of the sequence, or all off, if the sequence has ended).

Saving Event Times

AcuSail has the capacity to store just over 900 unique events. This data is retained when the power is removed and can, subject to some limitations, be recalled and downloaded at a later date (or scrolled through during an actual race day on the unit's display).

The product employs a rolling buffer scheme for storage, where only the very oldest data is overwritten by the very latest.

For those interested in more detail here, we will further explain the memory (and how to access retrospective times etc.) later in this section.

For now, all that's important to say is that each time **AcuSail** sounds a horn, either as part of a sequence or via a manual press of the *Horn* button, the time is automatically saved in the unit's internal memory.

Times are also saved (normally in silence) whenever the *Save Time* button is pressed. Incidentally, don't be too surprised if a horn or other event does occur when you press the *Save Time* button, as your *Club Programmer* may have configured it to operate 'auxiliary' functions, depending on your club's needs.

Irrespective of which button is pressed, times are <u>not</u> stored in memory until the first event of any race sequence; this allows you to test that everything is correctly connected (horns etc.) without saving unnecessary information.

Once a sequence has been started and with **AcuSail** in 'normal' mode (I.E. displaying the time (either as a '*Stopwatch*' or '*Time of Day'*), when an event occurs, the unit's display will automatically freeze, to give you enough time to manually note down both the **AcuSail** time display and the associated boat number(s). Once the 'freeze' period has elapsed, **AcuSail** will then return back to displaying the time.

The 'freeze' duration can be altered (or indeed disabled altogether) by your Club Programmer (between zero and a maximum of thirty seconds).

Display wise, **AcuSail** considers sequence events as the most important, followed by the time a manual *Horn* and/or *Time Save* button press occurred and then treats viewing the stored times in memory with the least priority.

Regardless of whether the event can or can't be directly displayed (because a higher priority event is occurring) the event time is always saved for later viewing/retrieval. Events that can't be directly shown are typically 'beeped'.

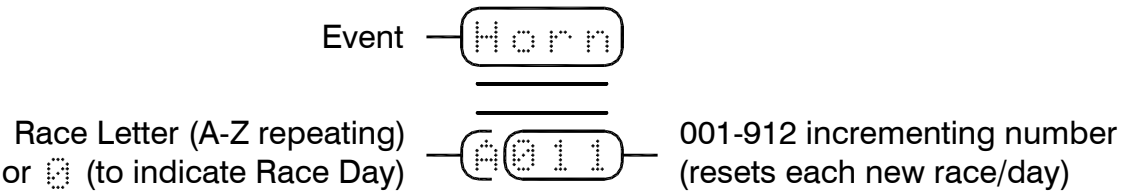
Whether or not **AcuSail** *beeps to the primary button push (of either the Horn or Save Time) can be altered by your Club Programmer (if a horn is going to sound, then having a 'beep' too, is typically irrelevant). In contrast, button pushes that result in no external action (so for example, if a horn is already sounding) are always 'beeped'. All events are saved regardless.*

AcuSail *is accurate to the nearest 1/10th of a second, but to avoid excessive and distracting display activity, the 1/10th of a second digit is only actually shown for saved times (I.E. when you actually need to see it). If your club doesn't need this accuracy, you may even find your Club Programmer has disabled the 1/10th of a second digit altogether.*

As each time is saved (either in response to a button press or a sequenced action), it is given an event type (Horn, Save etc.) which is then shown on the top line of the display.

This is then paired with a letter (for the current Race) and a unique three-digit number. This information is shown in the bottom of the display.

Let's take a moment here to look at how the captured data is identified…



In the above example, the recorded time was a manual horn, event #011, which occurred during race 'A'.

If the next event to happen was you pressing the *Save* button, the result would be '*Save A012*', meaning a Save, event #012, during race 'A'.

The first alphabetic character of the bottom text display only changes when you start a completely new race. This visually groups a set of race times together (as they will all start with the same letter).

This letter is automatically incremented each time a race is started (from 'A-Z'). Once 'Z' is reached, the next race will be 'A' again.

In addition to displaying events grouped by race it is also possible to show each stored time based on when it happened on the race day (so the first event is 0001 and the next 0002 etc.). This mode is Club Programmer selectable and is indicated by the first digit of the bottom display set to zero.

Irrespective of the display 'mode' (race letter or race day), the right-hand three digits of the bottom text display increment with each save, so that each saved time has a unique number. This number is reset whenever a new race is started (if you are displaying events grouped by race) but kept and incremented for race day display. If the overall limit of 912 events is ever reached on a single day, then you will find the very oldest entries are automatically overwritten by the newest (with the number resetting to 001).

The race letter and event number are only reset after the unit is powered down and a different date (to the last time the unit was used) is entered. If, for example, you power down **AcuSail** *at lunchtime and then restart the unit later in the afternoon (using the same date), the race letter and event number will increment from where you left off. Note that if you choose to ignore setting the date (using instead the software date) this will always reset the unit.*

Once you get the hang of how **AcuSail** stores times, you may find it sufficient to manually record boat numbers against the unique four-digit alphabetic/number generated during each race (rather than recording the actual time). This is generally more efficient when later collating the information on a PC.

Logging Lap Times

It's often handy to keep a record of a specific Lap time (say for the first boat) and, as you might expect, **AcuSail** provides a simple method of doing this.

If, when you press either the *Save* or the *Horn* button (i.e. to mark the boat crossing the line) you continue to hold the button until **AcuSail** beeps in acknowledgement (around three to four seconds), the unit will write a special 'LapX' message to memory (where X is a unique 'Lap number').

Manually Retrieving Times

When at least one race time or event has been stored in memory, you can view it (and any others that are stored) by pressing the *Mode* button (which switches you to memory mode). Press the button again, to revert to 'normal' operation.

If a sequence is running and a horn is about to sound, **AcuSail** *will not change to memory mode (to avoid confusion over flag timing etc.)*

Once in memory mode, **AcuSail** will start by displaying either the most recently stored time or the last stored time you looked at (whichever is the more recent of the two). If a manual *Horn* or *Save Time* occurs whilst you are reviewing times, then that will be instantly displayed instead. If a sequence event becomes due, then that will take precedence over all else (I.E. you cannot look at saved data when a sequence event is imminent) and **AcuSail** will leave memory mode altogether, in order to show the sequence event.

Let's further clarify a 'sequence event' at this point… Even if a sequence is running, there is nothing to stop you entering memory mode during periods of inactivity; I.E. only countdowns to 'events' sounding and those 'events' themselves prevent memory display – 'waits' between 'events' do not.

To look through the stored times once in memory mode, you use the *Up* and/or *Down* button(s) to move to later or earlier captured times. Holding either button will cause the stored data presented to change repeatedly. Holding both buttons together will increase the repeat rate (the first held button determines the direction of change).

AcuSail *can be set to automatically wrap the displayed memory data; I.E. going past the last stored time will take you back to the first and vice versa. If you find this isn't the case, then your Club Programmer has inhibited this setting, in preference to one where the data display does not increment or decrement past the extremities (some people do find this less confusing).*

As mentioned previously, you can manually exit from memory mode, at any time, by pressing the *Mode* button again. Alternatively, **AcuSail** will automatically exit (and return to Race time display), if left idle for longer than the 'memory freeze' time.

The automatic 'mode' switching time can be altered by your Club Programmer (from 'never' – so the memory mode is shown until exited by you pressing the Mode button or if some other event occurs, to a maximum of thirty seconds).

In order to prevent user errors, it is not possible to look at stored times from different race days manually. To download and look at retrospective timing data you will need to link **AcuSail** to a PC and follow a special procedure.

Viewing and Changing the Current Sequence

AcuSail has eight user-programmable sequences (numbered 1-8).

Irrespective of whether a sequence / race is running or not, you can always check what the current sequence is by pressing the *Select* button. **AcuSail** will also show you if a sequence is actually in progress, by the *Run Sequence LED* being permanently lit.

Note that you can only select a new sequence (from those pre-programmed), if there isn't one running already. You then need to hold the *Select* button for at least three seconds.

Once your request to change the sequence has been acknowledged (and assuming the *Club Programmer* has both allowed sequence selection and provided more than one option to choose from of course!), **AcuSail** will start to flash the current sequence displayed, to indicate readiness for change.

Use the *Up* and/or *Down* button(s) to scroll through the available sequences; holding either button will cause the sequence information to change repeatedly. If the selection on view does not match the current active sequence and a race isn't in progress, **AcuSail** will flash the *Run sequence LED,* so you know when a sequence differs from the current one in use (this indication is suppressed during a race for obvious reasons).

When the sequence you require is showing in the text display, simply choose it by pressing the *Select* button. If there is a change to the previous setting (so a new sequence is now going to be used), **AcuSail** will beep to acknowledge it and then quit the sequence selection mode (leaving the 'new' sequence on display for a short time). If your *Club Programmer* has decided that changes to the sequence should be stored as a new default, then that occurs at the same time.

Note that if you held *Select* (to change the sequence) and subsequently decided you don't want to change the sequence after all, simply choose the current sequence (the *Run sequence LED* will not be lit) and press *Select* to exit. No beep will sound, as there is no change to the current setting. You can also exit the selection by looking at the memory data (using *Mode)*.

To stop inadvertent sequence changing, your Club Programmer may have disabled the 'hold to change sequence' ability of the Select button. If this is true, then only the Club Programmer will be able to change the sequence.

Transferring 'Real Time' Data to a PC

Assuming you have correctly connected your PC to the **AcuSail** remote socket (refer to the appendix for connector wiring information and to understand the protocol) and that your *Club Programmer* has not disabled the facility, every time an event is saved to the **AcuSail** memory, it will also be output to your PC (using an RS232 serial connection).

To avoid any possible confusion with interleaved data, this 'real time' event data is inhibited during bulk transfers – I.E. it is automatically stopped when **AcuSail** *is copying a block of timing events (see below for more detail).*

Viewing 'Real Time' Data on a PC

AcuSail is bundled with a free Windows PC utility, which allows you to capture and view (in real time) the last twenty events, as well as showing which lights are active. The software also acts as a 'decoder' and file writer (for saving a large block of race times to a file for use by other software).

In the above, fictional (3 Start) example, you see a 6-3-0 sequence (with 3-0 being used for subsequent Starts). Start 2 is subject to a General Recall (hence why there are four Starts in all) and Start 3 has an Individual Recall. At 18:18 the first boat Laps and then the other follow (the 1st lap times use the *Save* button, so no horns sound). Finally horns signify the end of race times.

Note that we could have set **AcuSail** to also log the Class and Prep flags, but that option has been turned off for clarity. If you were viewing this in real time, the central section would mimic the lights and Horn/Aux operation.

AcuSail is fully operational without using this software, it's purely an enhancement should you wish to use it.

Transferring Current Day Stored Data to a PC

In addition to the real time data transfer method of passing information to your PC covered earlier, an individual race, or indeed a whole day's racing results, can be transferred to your PC in a single action.

To transfer stored data to your PC you must first be in normal mode (displaying the real time). Refer to the following table to ascertain which button(s) you then need to hold to achieve the data you desire…

Button Combination	**Resultant Data**
Up	Current Race Times (including flags)
Down	Current Race Times (excluding flags)
Up + Down	Entire Day Times (including flags)

Maintain the correct combination of button(s) for at least three seconds, after which (assuming there is data available and a transfer is not already in progress), **AcuSail** will give a confirmation beep and commence the transfer. Once the confirmation beep has sounded you can safely release the buttons.

Depending on the amount of events to process and where the first event that matches the specified criteria falls within the day, you may find **AcuSail** may take longer than three seconds to beep (the beep coincides with the first data 'match'). Indeed you will not get a beep at all if no relevant data exists.

Data is transferred oldest time first, newest time last, in the order it was saved. If a real-time 'time save' event occurs during a data transfer it will not be sent immediately (to avoid any confusion) but will (only if it's appropriate to the particular data request of course) be appended to the end of the transmission.

If you do not intervene, **AcuSail** considers any times saved to memory since you ran a sequence (and started a race), to be the data you wish transferred (under a 'Race Times' transfer). It may be however, that you wish to transfer the results from an earlier race. To do this, use the following procedure (prior to transferring the data)…

- Change to memory mode (with a short press of the *Mode* button) and select any event that falls within the past racing sequence.

- Exit memory mode by holding the *Mode* button; **AcuSail** will return to 'normal' mode (as you'd expect) and after three seconds will beep to confirm the change in 'live' sequence. You can then release the button.

Until you start a new sequence, **AcuSail** will now use this earlier race data (selected with the above procedure) in any Sequence/Race data transfer.

Transferring Retrospective Stored Data to a PC

AcuSail has a non-volatile memory capable of storing up to 912 different race times, even in the absence of power. Timing data is saved in a first in, last out rolling buffer, which means that the most recently stored times always overwrite the very oldest times.

The memory is divided into racing days (based on the date you set during a 'normal' power-up), of which there can be anything between one and eight. The more saved events your club averages in any particular day (I.E. the busier it is), the less 'old' days you are likely to have available retrospectively.

It is our estimation that even the busiest club running a full-on regatta is unlikely to store more than 350 times a day, whilst the quietest may only store 80 or so. Using these figures, the busiest club could store around two/three days racing in the 912 event memory (350x3=1050), whilst the quietest may get the full eight days (80*8=640).

Whatever the size of your club, the onus is on you to retrieve old data before it is overwritten.

Note that **AcuSail** will only show retrospective results where the full day's data is available; partial day results (where some of the old data has been overwritten by the latest results) cannot be accessed.

To display retrospective data, (or indeed the current days results if the unit has been powered down to relocate it), follow this specific procedure...

- Unplug the **AcuSail** battery supply and any horn(s).

- Hold the *Save Time* button and re-apply the battery supply.

- Once the '*Pick DayX*' message appears, release the *Save Time* button.

If the most recent day's racing contained a large number of entries (so many that the preceding one was partially overwritten), you will just be taken straight to that day (as it is the only valid set of data available).

The number flashing beside 'DayX' is an aid (in addition to the date itself) to identifying which block of data is which (where X=1 is the most recent and X=8 is the oldest). This helps if you've repeatedly ignored setting the date, as you'll have several sets of stored times, all with the default (software) date.

- Use the *Up* and *Down* buttons to cycle through the available racing dates. Holding either button will cause the information to change repeatedly. Holding both buttons together will increase the repeat rate (the first held button determines the direction of change).

- When **AcuSail** is showing the day you wish to transfer, press either the *Select* or *Save* button (it doesn't matter which). **AcuSail** will change the display to read '*Race DayX*' and give a short beep to confirm this.

Once you have set a particular date, you can transfer the information for the events of that day to your PC, exactly as described earlier (refer to 'Transferring Current Day Stored Data to a PC' - the method(s) are identical).

You can also examine the stored data on the **AcuSail** display, by using the *Mode* button to switch to memory mode. Note that, as there is no clock running (unlike 'normal' operation), **AcuSail** will remain in memory mode until you press the *Mode* button again (I.E. there is no timed return).

If you do not intervene, **AcuSail** considers the sequence of the latest time of the day to be the data you wish transferred (under a 'Sequence/Race' transfer). It may be however, that you wish to transfer the results from an earlier race. To do this, use the following procedure (prior to transferring the data)…

- Change to memory mode (with a short press of the *Mode* button) and select any event that falls within the past racing sequence.

- Exit memory mode by holding the *Mode* button; **AcuSail** will return to displaying '*Race DayX*' and after three seconds will beep to confirm the change in 'live' sequence. You can then release the button.

Until you select a different day, **AcuSail** will use this earlier race data (selected with the above procedure) in any Sequence/Race data transfer.

Note that if you wish to change to a different day (to access another set of stored results), you can press the *Save Time* button (rather than removing the battery supply) to get the '*Pick Date*' message to re-appear. If you want to exit this mode altogether (and restart **AcuSail** ready for another race), simply hold the *Run* button for three seconds.

Section 3 – Programming

This section is aimed at the person within your club who will be responsible for programming how **AcuSail** *operates - the 'Club Programmer'.*

Entering the Club Programmer Password

As shipped, **AcuSail** employs a six-digit factory set numeric password to protect both the system variable settings and the user-programmable sequences from modification by unauthorised users. A password is also needed in order to reset the unit back to its factory defaults.

Whilst it is possible to deactivate this protection (for all except restoring the factory defaults), we strongly recommend you leave it in place to avoid inexperienced users altering settings they do not understand.

To enter either of the programming modes, follow this specific procedure...

- Unplug the **AcuSail** battery supply and any horn(s).

- Hold either the *Mode* button (to access the system variables) or the *Select* button (to access the sequences) and re-apply the battery supply.

In either case (assuming that password protection has not been removed) and after a short prompt informing you of the mode you are in, you will now need to enter the *Club Programmer* Password to get any further.

Setting the password requires you to set three, two-digit values. You will first be prompted for *'Pass #1+2'.* The relevant digits will flash to indicate the current value.

Use the *Up* and/or *Down* button to set the desired value. Holding either button will cause the value to change repeatedly.

Holding both buttons will increase the repeat rate (the first held button determines the direction of change).

Once you have set the desired high value, press the *Select* button to move to *'Pass #3+4'* or, if you'd rather, the *Mode* button to move to *'Pass #5+6'*. Repeat the setting procedure to set the correct value.

Finally, press the *Select* button again to move to *'Pass#5+6'* or, if you'd rather, the *Mode* button *'Pass #1+2'* and set the correct value.

As you can see above, *Mode* and *Select* will move you left and right around the data whilst *Up* and *Down* will allow you to change it.

When the password is correct, press the *Save* button to confirm it and to move to the actual System Variable setting pages. If the password is incorrect, **AcuSail** will inform you of your error and then abort the programming mode and perform a normal power-up start.

If you cannot remember the password you will have to contact **jwp** and confirm your details*. The Password is factory set and cannot be changed.*

Setting System Variables

AcuSail is extremely programmable and can be configured (by simply changing certain *System Variables*) to operate in a variety of different ways. This flexibility allows you to easily tailor the unit to your club's specific needs.

To enter the System Variable setting mode, follow this specific procedure...

- Unplug the **AcuSail** battery supply and any horn(s).

- Hold the *Mode* button and re-apply the battery supply. Do not release the button until the '*Syst Prog*' message is displayed.

- Enter the Club Programmer Password (if prompted) - (refer to 'Entering the Club Programmer Password' if you do not know how to do this).

Assuming your password is valid, you will now be in the correct mode, if not, **AcuSail** will abort the current mode and perform a normal power-up.

As soon as you change any variable from its current stored value, **AcuSail** *will light the Run Sequence LED to alert you. Additionally, should you wish to, there is a special procedure (refer to 'Upgrading the Product Software') that allows you to replace the factory defaults with your own, thus preventing them being overwritten during a default restore.*

For ease of access, a detailed breakdown of the eighty odd variables **AcuSail** uses to control a variety of operational functions, is contained at the very back of the Appendix. The list is in the order the settings are presented (i.e. as offered during 'System Programming' mode), with each entry having a simple explanation of use.

To modify the variable currently on display (the current setting of which will be flashing), use the *Up* and/or *Down* buttons to change the value.

'*Yes*' or '*No*' answers will alter once with each button press (either *Up* or *Down*), whereas, for variables with multiple answers, holding either button will cause the information to change repeatedly. Holding both buttons will increase the repeat rate (the first held button determines the direction of change).

To move to a different variable press either the *Mode* or the *Select* button. *Select* will take you in one direction and *Mode* will do the opposite (with the last variable on the list wrapping back to the first). Note that these buttons can also be held (as per *Up* and *Down* - *I.E.* to have the change happen repeatedly), but in this case there is no speed increase for holding both (it would be too confusing).

For the few variables that have more than one 'field' on the same screen (for example defining the status of the five lights during Individual and General recalls) you can move left to right across the display using the *Horn* button.

Once you are happy with all the modifications you have made, simply hold the *Save Time* button for three seconds to save everything.

This will store your changes (if indeed you made any), semi-permanently in the non-volatile memory.

Saving System Variables and Sequence Data to a PC

Should you wish to save your current set-up (including all the sequence data) to your PC (so you subsequently reload it as the 'factory' defaults), then instead of pressing and holding the *Save Time* button to exit from setting the System Variables, press and hold the *Run Sequence* button instead.

However you exit the mode (so with either *Save Time* or *Run*), **AcuSail** will beep, display the message 'Update Syst Data' and, once the data is stored, perform a normal power-up start using the new settings.

Creating a Sequence

AcuSail has eight user-programmable sequences (numbered 1-8) any, or all of which, can be used to store a custom-timed event sequence, tailored to your club's individual requirements. Each sequence can have up to a maximum of thirty two unique steps and each has a four-character, user-programmable, name as an aide memoir.

Sequences can be either an infinite loop (where, once started, a particular set of events is repeated continually until the user intervenes) or a set length (where, once all the events have been completed, the sequence comes to an end on its own).

Programming a sequence is a two-step process, and accordingly, we've broken it into 'Basic' (which has to be done) and 'Advanced' (semi-optional).

The first part of the process defines the core timing, while the second part builds on this foundation, adding clearer, more specific user prompts and, if desired, lighting control as well.

Basic Sequence Timing Elements

Sequences are made up of a combination of eight different timing elements;

Display	Meaning	Valid Values
Wait	A Wait (in silence)	From 1 sec to 120 sec (2 min) in 1 sec steps
Horn	A Horn is sounded	From 1 sec to 8 sec in 1 sec steps
Aux	An Aux event	From 1 sec to 8 sec in 1 sec steps
HnAx	A Horn & Aux event	From 1 sec to 8 sec in 1 sec steps
Loop	The start of a loop	
LpXX	The end of a loop	XX= 00 (infinite) or 01-10 (#of passes)
Beep	A Beep Countdown	From 1 sec to 30 sec in 1 sec steps
STOP	The sequence end	

Each element you use, takes one step in the (up to 32 step) sequence.

The very first step in any sequence is step#0. In actuality, this step isn't really a step at all (hence why we call it '#0'), but it defines how **AcuSail** synchronises the sequence to the clock (so in effect it occurs pre step#1).

While Step#0 is a *Wait* (as defined above), *there are* some subtle differences; It can be zero (for an instant start) and is only selectable in multiples of 10 seconds (up to 120 sec). Additionally, and we STRONGLY recommend this is how you set this step, it can also be set to '*Auto*' i.e. the sequence will '*automatically*' synchronise with the clock, so will always start at XX:00.

Step#1 is always a Beep count (of a user programmable duration), counting, of course, to the first event.

From then on, **AcuSail** intelligently evaluates the preceding step when deciding the valid options for the current step you are programming.

This results in a selective offering of the above sequence elements, determined by what is appropriate at each step. You will not, for example, be offered the option to insert a *Wait* immediately after a *Beep* count (as you would not want a countdown to a period of silence) or be allowed to start a second looped section without ending the first (loops cannot be nested).

Incidentally, within this structure, it is possible to generate wait or horn/aux times that are longer than the maximum for a single step by either combining two adjacent sequence steps (to produce the total duration needed) or using the *Loop* function to run any element a number of times.

A Sequence Timing Example

Shown in the table below is the factory-programmed data for sequence '1', which is supplied with **AcuSail** when you first get the product and is set as the default sequence ('*Seq1*').

This is a continuously looping five-minute sequence conforming to the RYA racing rule 26 (the name used is '541L' – so horns @ 5,4,1 with a loop);

Step	Seq		Time		Dur	Action	Meaning
0	*Wait*				Auto		Sync to next XX:00
1	*Beep*	⇩	- 0:10		00:10	Beep Count	
2	*Horn*	⇩	0:00		00:02	Horn (2 sec)	Class Flag @ 5
3	*Loop*	⇩	+0:02		00:00	Loop Start	Repeat till end
		⇙	⇦				
4	*Wait*	⇩	+0:02	⇖	00:48	Wait (48 sec)	
5	*Beep*	⇩	+0:50		00:10	Beep Count	
6	*Horn*	⇩	+1:00	⇧	00:02	Horn (2 sec)	Prep Flag @ 4
7	*Wait*	⇩	+1:02		02:00	Wait (2 min)	
8	*Wait*	⇩	+3:02	L	00:48	Wait (48 sec)	
9	*Beep*	⇩	+3:50	O	00:10	Beep Count	
10	*Horn*	⇩	+4:00	O	00:02	Horn (2 sec)	Prep Flag @ 1
11	*Wait*	⇩	+4:02	P	00:48	Wait (48 sec)	
12	*Beep*	⇩	+4:50		00:10	Beep Count	
13	*Horn*	⇩	+5:00	⇗	00:02	Horn (2 sec)	Class Flag(s) @ 0/(5)
14	*Lp00*	⇩	+5:02		00:00	Loop End	Loop 00 times (I.E. Infinitely)
		⇘	⇨				

Note that no *STOP* element is needed in this case, as the Loop is infinite.
Please take a little time trying to understand the above table, as it uses a good selection of the main timing elements that are available to you and shows exactly how **AcuSail** processes a sequence. To construct your own sequences you will need to fully grasp the concepts shown here.

Sequence Rules

As mentioned earlier, as you programme a sequence, **AcuSail** intelligently controls the elements you can choose from. To clarify this further (and to help if you get confused), here are the key 'rules' employed…

- Step#0 is always a Wait, typically set to '*Auto*' (to sync to XX:00).
- Step#1 of any sequence is always a *Beep*.
- A *Beep* cannot ever follow a *Beep*.
- A *Beep* cannot ever precede a *Wait,* a *Loop* or an *LPxx*.
- There must be at least two steps between a *Loop* and an *LPxx.*
- There must be at least one step between an *LPxx* and a *Loop*.
- You cannot nest *Loops* – I.E. Each *Loop* must be closed with a *LPxx*.
- Step#29 or Step#30 cannot be a *Loop.*
- Step#31 cannot be a *Loop,* a *Beep* or a *Wait*.

Horns, *Auxes*, *HnAx* and *Waits* can all be freely 'extended' (with no break), by putting multiple elements of the same type (with different lengths if required) one after the other; obviously this is typically more useful with Waits.

Entering Sequence Programming Mode

To enter the Sequence Programming mode, follow this specific procedure...

- Unplug the **AcuSail** battery supply and any horn(s).
    - Hold the *Select* button and re-apply the battery supply. Do not release the button until the '*Seq Prog*' message is displayed.
- Enter the Club Programmers Password (if prompted) - (refer to the above section, 'Entering the Club Programmer Password' if you do not know how to do this).

Assuming your password is valid, **AcuSail** will then *Beep*, change the display to read '*SeqPro*' and present you with details of the first sequence (flashing to indicate you can select it). If your password is invalid, **AcuSail** will abort the Sequence Programming mode and perform a normal power-up.

Choosing the Sequence Number

As soon as the '*SeqPro*' message is displayed, you can use the *Up* and/or *Down* button(s) to access the sequence you wish to programme, by scrolling through the available sequences (don't worry about the current name at this point, just choose the correct sequence number (*Seq1-Seq8*).

As you scroll through the sequences you will see that any protected (locked) sequences will have their name blanked out (refer to the above section 'Setting System Variables' for more information); you will not be able to programme these sequences without first removing the protective lock.

When the sequence you require is showing in the text display, press either the *Select* or the *Save* button (in this instance either is fine) to accept it. **AcuSail** will beep to confirm your action and the first character of the sequence name will now start to flash.

If you tried to select a locked sequence, your button press will have been ignored; remove the relevant lock (see Setting System Variables') prior to attempting this exercise.

If you inadvertently selected the wrong sequence, you can always return to the previous page (I.E. the one just described), by pressing the *Mode* button.

Setting the Sequence Name

Once the first character of the sequence name is flashing, you can use the *Up* and/or *Down* button(s) to access a suitable letter/number/graphic from the available character options.

Holding either button will cause the value to change repeatedly. Holding both buttons will increase the repeat rate (the first held button determines the direction of change).

As soon as the name does not match (because you changed one or more of the characters), **AcuSail** *will light the Run Sequence LED to alert you to this.*

To move to the next display character, press the *Select* button. Pressing the *Select* button when you are on the last character will return you to the first.

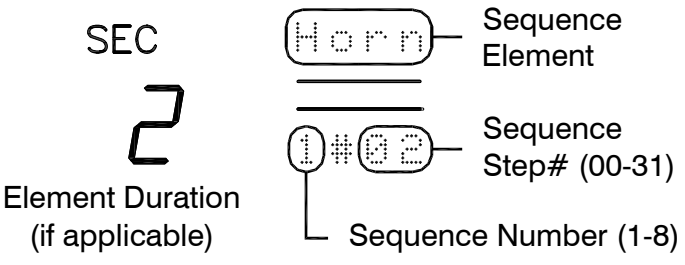
Once you are happy with the sequence name press the *Save* button. **AcuSail** will beep to confirm acceptance and move you to the first step of the sequence you are about to programme (saving any changes you made).

Incidentally, until this point in the programming process, pressing *Mode* will always return you to the previous page (where you selected the sequence). Moving forwards, i.e. during sequence step programming, the *Mode button* has a very different purpose.

The very first time you move to programming a sequence, **AcuSail** *inserts an additional 'SeqX Wipe' step, to allow you to easily clear all of the existing sequence data (should you so wish). If you don't want to start a fresh, simply press Select or Save to continue ('No' is the default); if you want to clear everything, select 'Yes' (with Up or Down) and then Select or Save.*

Programming a Sequence Timing Element

The diagram on the right shows a typical sequence step as presented by **AcuSail** during Sequence Programming



In the above, you can see that step#02 in sequence#1 is currently a two second horn (we've lifted this from the earlier '541L' sequence example).

Pressing the *Select* button will move you in a cyclical fashion round the three display/data areas. You will move from the Step#, to the Element Duration and then to the Element Type.

A further press of the *Select* button will take you back to the Step# once again. In each case, the current active area of the display will flash.

If the element on display is either a STOP or a LOOP you will simply move back and forwards between the Step# and the Element Type (neither a STOP nor LOOP start have any duration or a number value).

Once the area you wish to look at/modify is active, you can change the value using the *Up* and/or *Down* buttons. If you do this whilst the Step# is active, you can go backwards and forwards through the sequence (stopping at each end for clarity).

AcuSail *will only show you the full thirty two steps of a sequence, if you have not programmed a STOP or Lp00 (an infinite loop) at any point in the sequence. All elements after a STOP or an Lp00 are deemed irrelevant (as they have no effect on a sequence).*

If you use every sequence step, **AcuSail** *will automatically stop after the thirty second step. Any unclosed Loop will be ignored.*

Once you have changed the value of any step in the sequence, you must press the *Save* button if you want to store the change to non-volatile memory. You certainly do not have to do this with every step (I.E. you can make changes to a number of steps and then save the entire sequence in one go), but until you do this, your modifications will not be saved.

As soon as the sequence no longer matches the current data (because you changed one or more of the steps in some way), **AcuSail** *will light the Run Sequence LED to alert you to this.*

Testing the Sequence Timing

When you think you are happy with your sequence, **AcuSail** allows you to debug and test it without leaving the sequence-programming mode.

To do this, you simply run the sequence as you would normally (I.E. using the *Run Sequence* button). **AcuSail** will start the 'TEST' immediately by showing six L-R scrolling 'bars' (as a pre-cursor to step#0 happening). It will then show step#0 (for a further 4 'bars', regardless of how it's programmed), before continuing with the rest of the sequence as you would expect.

Note you can only *run a sequence (to test it), if its been saved first; If the Run Sequence LED starts to flash (and nothing else happens when you press the Run Sequence button), this indicates you've not saved your changes. Simply press the Save button and then try again.*

In order to keep preview times to a sensible duration, sequence preview takes place at twice real-time speed. You will also notice, that in this 'debug' mode, the clock displays the elapsed time from step#01 (as opposed to the 'real' time) and that, at least initially, the hour digits are blanked.

Once running, if **AcuSail** encounters a *Loop* start, it will show '*LP*' in the hour digits area. This will remain until the loop is terminated (with a *LPxx* command), at which point the display will change to '*LX*' (where 'X' is the number of times left to go around the *Loop* and 0 is infinite). Once a *Loop* is exited, the hours digits will, once again, blank.

During testing, **AcuSail** uses the left-most five decimal point LEDs, as 'mirrors' of the 5-4-3-2-1 light status; i.e. If the left most DP LED, is lit then light output#5 would be on for that particular step. Light programming is covered in more detail later.

To stop the sequence at any point, simply press the *Run Sequence* button again (there is no need to hold the button); the sequence will abort on the current step. Once stopped, you can continue to make changes and correct any timing/element errors.

You can exit the detailed sequence-programming pages at any point (returning to the base sequence selection page) by holding the Mode button for at least three seconds. Alternatively if you hold Save for a similar time, **AcuSail** *will perform a normal power-up (any changes will, of course be saved during this exit).*

Defining the Race Start (i.e. the 00:00 Stopwatch point)

Although the first horn of the first sequence is where **AcuSail** commences logging, it's typically NOT the start of the first race. Even the third horn (so the first class start, after say the class and prep flags, in a standard RR26 start) may not be where your club deems 'zero' (if you have multiple starts).

Whatever your particular preference**, AcuSail** allows you easily set any *Horn* (or indeed *Aux* / *HnAx*) in the sequence as the 00:00 point.

To set a Race Start you need to be already '*Programming a Sequence Timing Element*' (as described above). Now simply press the *Horn* button on the step you want to be 'zero' and **AcuSail** will add a '00:00' to it. Pressing *Horn* again will remove the marker.

Once you've got the point correctly identified, all you then need to do is to ensure the sequence is saved with it. **AcuSail** will only allow you to mark one Horn as the zero point and, if you don't mark one, will assume it's the first.

Operationally, if you are using **AcuSail** with timings shown as a Stopwatch (as opposed to referenced to Time of Day), all events that occur before the 00:00 point (including any countdown to 00:00) are all shown as negative.

Setting the Recall Sequence Start Point

In multiple Start races, the Class Start Horn is typically synchronised with the call to order of the next Class. i.e. in a typical 5-4-1-0 Start sequence, the '5' of Class 2, is the '0' of Class 1. To make this happen, **AcuSail** allows the beginning of a 'Recall Sequence' to be removed, so that when the two sequences merge, there is no perceivable gap (i.e. while you would normally be waiting for the 'Recall Sequence' to sync to the next minute).

The variable controlling this functionality is '⬅GR⬅ From' and has a *Club Programmer* value of 3 to 15 (relating to the start step in the sequence).

There are a couple of additional 'rules' around this variable as follows;

- It MUST point to a sequence step which is a WAIT
- The WAIT must be at least 2 seconds
- Any of the proceeding steps cannot be a STOP
- Any of the proceeding steps cannot be a LOOP

Assuming the criteria is met, **AcuSai**l will seamlessly synchronise the 'WAIT' step of the new sequence to the end of the last Start Horn of the old one.

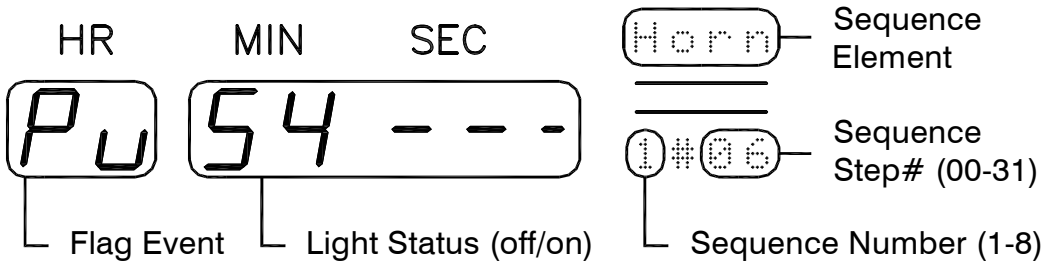
Enhancing a Sequence

Once you've got a start sequence you are happy with timing wise, you can add additional functionality to it, with meaningful messages (with regard to flags etc.) as well as defining the light status for each step.

In practical terms, this additional information is added 'on top' of the basic sequence timing data you've already created. You do this, by swapping to alternate, yet closely linked page(s), by simply pressing the *Mode* button.

As with basic sequence programming, the first time you press Mode, **AcuSail** *inserts an additional 'EvLx Wipe' step, to allow you to easily clear all of the existing flag and light data (should you so wish). If you don't want to start a fresh, simply press Select or Save to continue ('No' is the default); if you want to clear everything, select 'Yes' (with Up or Down) and then Select or Save.*

Let's take a look at a typical Flag Event and Light Status step…



In the above, you can see that step#06 in sequence#1 is currently a Horn.

The right-hand part of the display is nothing new in terms of presentation (it's identical to the basic sequence pages), and, as before, for consistency, we've lifted this from the earlier '541L' sequence example.

What is new here, is that the two left-most digits (the hours – HR), now show the flag event (Pu or 'Prep Flag Up' in this example), while the other digits are being used to define the light status (5 and 4 on, with 3+2+1 all off in this example).

For each sequence step, you can freely move back and forth between the element/timing page and the flag/light page by pressing the *Mode* button.

The flashing part of the display is what you will change with the *Up* and/or *Down buttons,* while *Select* will move you around the various areas.

For the flag/light page(s) alone (where there are several things you may need to change), you can also use the *Horn* button to move you back and forth between the step# and whatever you are currently modifying (so you can easily move between steps, making changes to each as you go).

Assigning Flags to Sequence Horns

AcuSail allows you to assign one of eight different Flag events to each sequence step. These are as follows…

- - - Nothing
- CF Class Flag
- Pu Prep Flag Up
- Pd Prep Flag Down
- St Start
- U1 User Flag / Message #1
- U2 User Flag / Message #2
- U3 User Flag / Message #3

Using the example sequence from earlier, let's look at the displayed messages both before and after a (typical) assignment.

First, here is how AcuSail would present/store the sequence without any flag events being added at all (i.e. just the basic timing elements exist)…

Step	Seq		Time		Event	Stored Msg	On Screen Message
1	*Beep*	⇩	- 0:10		- -		Horn inXX
2	*Horn*	⇩	0:00		- -	SHrn *	Horn forX
3	*Loop*		+0:02		- -		
		⇙	⇦				
4	*Wait*	⇩	+0:02	⇖	- -		
5	*Beep*	⇩	+0:50		- -		Horn inXX
6	*Horn*	⇩	+1:00	⇧	- -	SHrn *	Horn forX
7	*Wait*	⇩	+1:02		- -		
8	*Wait*	⇩	+3:02	L	- -		
9	*Beep*	⇩	+3:50	O	- -		Horn in XX
10	*Horn*	⇩	+4:00	O	- -	Shrn *	Horn forX
11	*Wait*	⇩	+4:02	P	- -		
12	*Beep*	⇩	+4:50		- -		Horn inXX
13	*Horn*	⇩	+5:00	⇗	- -	Shrn *	Horn forX
14	*Lp00*	⇩	+5:02		- -		
		⇘	⇨				

***** Shrn in the above, is **AcuSail**'s way of storing/showing a '*Sequence Horn'.*

Now let's assign some Flag events as they would be typically used….

Step	Seq		Time		Event	Stored Msg	On Screen Message
0	*Wait*				CF		C⚑X⬆ Next
1	*Beep*	⇩	- 0:10		CF		⬆C⚑⬆ inXX
2	*Horn*	⇩	0:00		CF	C⚑X⬆	Horn forX
3	*Loop*		+0:02		- -		
		⇙	⇦				
4	*Wait*	⇩	+0:02	⇖	Pu		P⚑X⬆ Next
5	*Beep*	⇩	+0:50		Pu		⬆P⚑⬆ inXX
6	*Horn*	⇩	+1:00	⇧	Pu	P⚑X⬆	Horn forX
7	*Wait*	⇩	+1:02		Pd		P⚑X⬇ Next
8	*Wait*	⇩	+3:02	L	Pd		P⚑X⬇ Next
9	*Beep*	⇩	+3:50	O	Pd		P⚑X⬇ in XX
10	*Horn*	⇩	+4:00	O	Pd	P⚑X⬇	Horn forX
11	*Wait*	⇩	+4:02	P	St		StX➡ Next
12	*Beep*	⇩	+4:50		St		StX➡ inXX
13	*Horn*	⇩	+5:00	⇗	St	StX➡	Horn forX
14	*Lp00*	⇩	+5:02		- -		
		⇘	⇨				

As you can see defining exactly what each Horn relates to (in terms of flags etc.), not only enhances the clarity of the display to the Race Officer, but also makes the stored 'automatic' (i.e. part of a sequence) messages, infinitely clearer for all to understand.

Defining Lights for each Sequence Step

AcuSail supports up to five 'light' outputs in addition to the two relays (Horn and Aux). These 'outputs' are sent via the serial output and can be decoded/displayed both by our PC utility and/or sent to an (optional) hardware decoder box (to drive physical lights).

In a very similar fashion to the flag assignment described above, you can define whether a light is on or off for each sequence step. The light will be on if the number is showing (so 5,4,3,2,1) and off if a central 'bar' is displayed.

Note that, unlike the Horn and Aux outputs, the light outputs are NOT momentary, i.e. they remain on (if set so) for as long as each sequence step lasts.

In addition to sequence definition, you can also set-up two light patterns for General and Individual Recalls (this is done through the '*System Variable*' pages). Once triggered and until cancelled, these will take precedence over any existing light pattern.

Adding Reminder Messages

While we've included this here as an enhancement (which it undoubtedly is), if you think you might want to use this feature, you will need to factor this in earlier in your planning (i.e. when considering the basic sequence step timings).

Reminder messages are triggered under two specific conditions…

- On a '*Wait*' with a duration of one second
- When the 'Wait' has been assigned 'U1', 'U2' or 'U3' (a user message)

Assuming that the above criteria are met, **AcuSail** will beep once and display the appropriate user message for the duration set by the '*MsgW Time*' (see 'Setting System Variables above). The message will only remain on display until a higher priority event occurs.

A typical use of this function might be to remind the Race Officer to stow a particular flag after a certain duration.

Defining User and Aux Messages

AcuSail allows you to create three custom 'User' messages (U1-U3), which can either be used in place of the pre-defined ones during sequences, or can be 'popped up' as reminders (possibly to stow flags etc.) as required.

Additionally, the unit allows the text for both the '*Aux*' and '*HnAx*' relay to be replaced with something more meaningful, so that the secondary function offered here, can be appropriately named.

To enter the Name Programming mode, follow this specific procedure...

- Unplug the **AcuSail** battery supply and any horn(s).
    - Hold the *Horn* button and re-apply the battery supply. Do not release the button until the 'Name *Prog*' message is displayed.
- Enter the Club Programmers Password (if prompted) - (refer to the above section, 'Entering the Club Programmer Password' if you do not know how to do this).

Assuming your password is valid, **AcuSail** will then *Beep*, change the display to read 'LAbEL=' and present you with the text currently associated with '*Usr1*'. The first letter will be flashing to indicate you can select it.

If your password is invalid, **AcuSail** will abort the Name Programming mode and perform a normal power-up.

For the character flashing, you can now use the *Up* and/or *Down* button(s) to access a suitable letter/number/graphic from the available character options.

Holding either button will cause the value to change repeatedly. Holding both buttons will increase the repeat rate (the first held button determines the direction of change).

As soon as the name does not match (because you changed one or more of the characters), **AcuSail** *will light the Run Sequence LED to alert you to this.*

To move to the next display character, press the *Select* button. Pressing the *Select* button when you are on the last character will return you to the first.

Once you are happy with the name, press the *Save* button to store it. **AcuSail** will beep to confirm acceptance and the Run Sequence LED will go out.

The other names you can change, are all accessed via the *Mode* button. Note there are eight in all, where '⬇U1⬇' is the text shown on the lower display at the same time '*Usr1*' is the top display message etc. (i.e. each '*Usr*' message has a top AND bottom component).

Note that you cannot change messages without first saving the one you are currently on (if you've modified it). Trying to do this will result in the *Run Sequence LED* flashing to indicate your error. Simply *Save* to clear.

To leave this mode hold the *Save* button for three seconds. **AcuSail** will beep and then do a normal power-up.

Default Sequences

All of the eight available user-programmable sequences (1-8) are supplied factory programmed with data (which can be overwritten as required).
As covered earlier, (refer to 'A Sequence Example') *Seq1* complies with Racing Rule 26 and loops continuously around a 5-4-1 five-minute sequence. For identification purposes this sequence is called '*541L*'.

The sequence is programmed with the following steps…

1. *Beep* for 10 seconds
2. *Horn* for 2 seconds
3. *Loop* (start of loop)
4. *Wait* for 48 seconds
5. *Beep* for 10 seconds
6. *Horn* for 2 seconds
7. *Wait* for 2 minutes
8. *Wait* for 48 seconds
9. *Beep* for 10 seconds
10. *Horn* for 2 seconds
11. *Wait* for 48 seconds
12. *Beep* for 10 seconds
13. *Horn* for 2 seconds
14. *LP00* (infinite loop)

Seq2 contains a sequence based on horns sounding @ 3-2-1 and is also looping. This is programmed to be '*321L*'.

The sequence is programmed with the following steps…

1. *Beep* for 10 seconds
2. *Horn* for 2 seconds
3. *Loop* (start of loop)
4. *Wait* for 48 seconds
5. *Beep* for 10 seconds
6. *Horn* for 2 seconds
7. *LP00* (infinite loop)

All other sequences (so *Seq3-Seq8*) are set to simply to be a Beep count which terminates in a *STOP*. As these do nothing they are all named 'Null'.

Restoring the Factory Defaults

To restore the Factory Defaults, follow this specific procedure...

- Unplug the **AcuSail** battery supply and any horn(s).

- Hold one of the following combinations of buttons (depending on which defaults you wish to restore) and then re-apply the battery supply…

    - *Mode* and *Select* = System Variables only.
    - *Mode*, *Up* & *Select* = System Variables and Factory Sequences.
    - *Mode*, *Down* & *Select* = System Variables and User Sequences.
    - *Mode, Up, Down* and *Select* = System Variables and all Sequences.

Be sure to wait until '*Syst Load*' is displayed before you release the button.

Note that the split between what is 'Factory' and 'User' is programmable.

- Enter the Club Programmer Password - (refer to the above section, 'Entering the Club Programmer Password' if you don't know how to do this). A password is always required to restore the defaults.

If your password is valid, the factory defaults will be reloaded ('*Update* Syst *Data'* is displayed to indicate this), if not, **AcuSail** will abort the current mode. Once data is restored, the unit will perform a normal power-up.

N.B. If your club has pre-programmed sequences or modified system variables which you are keen to keep (and have saved already), please refer to our firmware upgrade instructions (supplied separately).

Upgrading the Product Software

AcuSail has been constructed using a flash-based microcontroller (if you like, a single-chip computer), which allows the firmware (I.E. the embedded software that actually runs the unit) to be upgraded directly to the chip itself, whenever new features are added or operational refinements are made.

This upgrade can actually be done 'in the field' (or perhaps more appropriately by/on the lake/reservoir!) – I.E. the unit does not need to be returned to the factory, this can be done by you, the end user.

In order to perform the firmware upgrade, you'll need a Windows based PC (not a Mac) with a serial connection (or with a suitable USB to serial adaptor), a small software programme from us (supplied with full instructions) and a suitably wired serial communications cable (available as an accessory).

The latest version of the firmware is available on request and is only supplied to known users. If you require additional copies of this manual, it can be downloaded via www.acusail.com.

Appendix

Connectors and Pin-outs

AcuSail uses Bulgin Buccaneer® standard series connectors for all connections to and from the unit.

These connectors are robust and waterproof (to IP68). Each pin within the connector has a screw terminal (you will need a small flat-headed screwdriver to wire up your own cable).

In order to disassemble a connector, you can use the protective cap that covers the *Remote Control* socket (when not in use) as a form of 'spanner'.

12V-24V DC Input

The Battery input requires a two-pin cable-mount female connector, which is supplied with your **AcuSail** unit. The pins are assigned as follows;

Pin 'L' Battery Positive
Pin 'N' Battery Negative

Although **AcuSail** is fully polarity protected (to prevent any issues arising from faulty wiring), you must ensure that the voltage applied to this socket never exceeds 34 Volts DC.

Unless you have set **AcuSail** *(internally via JMP1) to have an isolated Horn output, the incoming voltage is switched to the Horn/Aux output. In normal operation, if you are using a 12V battery, you should employ a 12V Horn.*

Horn Output

The *Horn Output* requires a four-pin cable-mount male connector, which is supplied with your **AcuSail** unit. The pins are assigned as follows;

Pin 1 *Horn Output* (switched battery positive or closure)
Pin 2 Common for *Horn Output* (battery negative or closure)
Pin 3 *Aux Output* (switched battery positive or closure)
Pin 4 Common for Aux *Output* (battery negative or closure)

Internally, you jumper-link select (via *JMP1/2*) whether each output receives the incoming positive battery supply (relay switched) or is a completely isolated switch closure. Each output can be configured independently.

N.B. both outputs are each internally fused at 10A, which is the absolute maximum current that **AcuSail** can switch, either per output or in total. This is also the maximum current, per pin, that a four-pin Buccaneer® standard series connector can support.

In order to assist with output load control, a (default = '*No*') software setting prevents both outputs switching together (you can also disable the Aux relay in hardware, by removing internal link LK2).

Your *Club Programmer* can of course set/reset either of these, but please only do so if you are absolutely sure that you will not exceed the total combined load limit of 10A.

If you definitely require to switch Horns with a higher current than 10A, you will need to arrange an external relay box (or purchase our optional high-power - 32A relay unit). See later in this appendix for wiring information.

Remote Control Socket

If you want to utilise the Remote Control socket for additional functionality, it requires an optional six-pin, cable-mount male connector (this assumes, of course, that you choose to not buy one of our pre-made cables or controls).

The pins are assigned as follows;

Pin 1 Logic +5V (100mA max)
Pin 2 Logic Ground (OV)
Pin 3 *Save Time* Remote Switch Input (and RS232 Input)
Pin 4 *Horn* Remote Switch Input
Pin 5 Aux Tally (@ RS232 levels)
Pin 6 RS232 Output

Pin 1 is a (100mA resettable fused) +5V Logic supply for powering of additional external Logic and for use by simple external switches.

Pin 2 is the Logic Ground. Internally, you can isolate this Ground from the main battery negative by removing jumper-link *LK1*.

Pins 3 and 4 are remote control lines that duplicate the *Save Time* and *Horn* switches. These lines are not directly connected to the internal switches and are processed separately. To get these lines to function they should be connected to Pin 1, or to a PC at RS232 levels (where Logic + = active).

Note that it is possible to enable/disable either/both of these control lines in software (refer to 'Setting System Variables' for more information).

Pin 5 is a direct 'Tally' (I.E. copy) of the Aux Output at RS232 levels (+/-12V - where Logic - = active).

As mentioned earlier, it is possible to disable the Aux relay (by removing internal jumper-link LK2) and/or to then use Pin 5 to trigger a PC (with custom software). Contact **jwp** *for more information on this specialist application.*

Pin 6 is the RS232 output for transferring timing data to a PC.

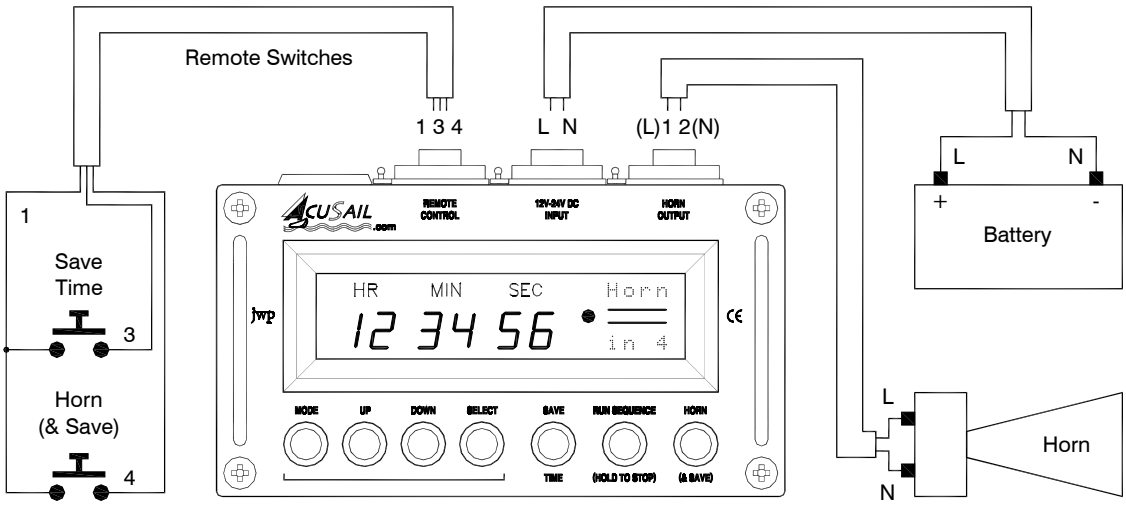
Connectors on Optional Items

The above pin-outs are standard for the entire **AcuSail** system. Although our high-powered relay unit uses Bulgin Buccaneer® 900 series connectors, (for the higher 32A rating they offer) the pin connections are named identically.

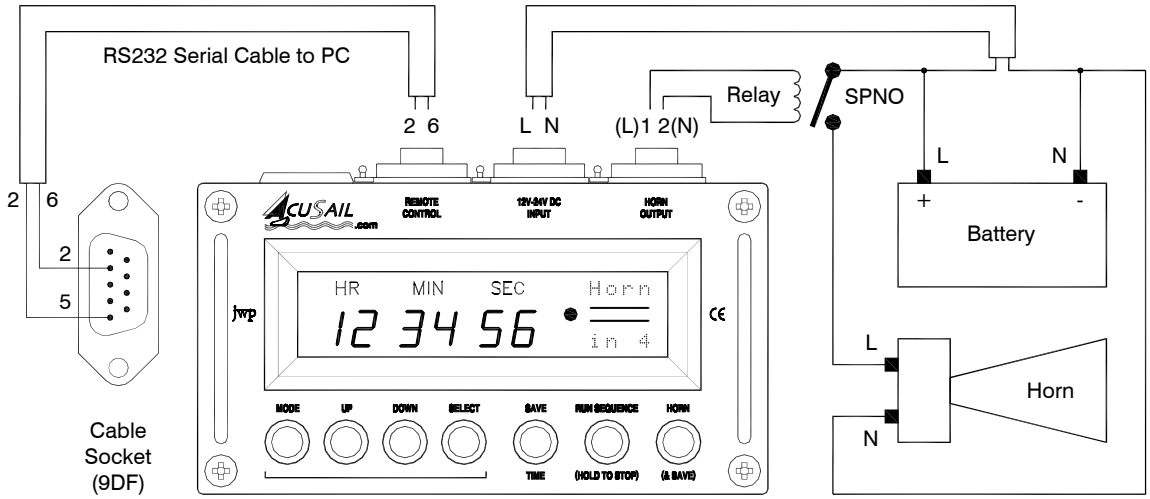
All accessories that bolt directly to the main **AcuSail** unit (Horn Unit/Battery Unit/Relay Unit) are supplied with integral cables (flying leads).

In addition to the accessories that fit to the main unit, **jwp** offer a range of cables, light interfaces, switch remotes etc., all designed to extend the core features. Please contact us for more information about what is available.

Typical Wiring Diagram (Horn <=10A)



High-powered Horn Wiring Diagram



As an alternative to undertaking this wiring yourself, a high-powered (32A) relay unit, providing all of the necessary connectivity shown in this diagram (excluding the RS232 PC connection), is available. This accessory is supplied in a similar box to **AcuSail**, is splash proof (to IP64) and bolts underneath the main **AcuSail** unit.

Data Transfer

Baud Rates and Timing

AcuSail serial data is 8 bit, with no parity and one stop bit and is transmitted at a user-selectable speed (between 9,600 and 115,200 baud). CTS/DTR/RTS/DSR and other handshaking lines are not implemented. For best results, just connect data Tx to the PC. (I.E. No Rx).

Should character over-run occur on the receiving PC, It is possible to insert a 0-50 millisecond (in 10mS steps) inter-character delay by altering the '*Coms CDly*' system variable. In addition to this, the '*Coms Ldly*' performs the same function at the end of each full line (0-100mS in this case). Refer to the above section 'Setting System Variables' for details on how to change these values.

File Data Protocols

The overall file protocol used for PC transfer is selected by altering the '*Coms =CSV'* (i.e. comma separated value) system variable. Refer to the above section 'Setting System Variables' for details on how to change this value (between universal 'CSV' when set to 'Yes' and Excel™ text when set to 'No').

Irrespective of format, all transfers utilise ASCII delimited data (so the high bit is never set), with each saved time transmitted on a separate line (i.e. terminated with a carriage return/line feed).

To assist with detecting blocks of data, all BULK transfers (i.e. NOT real time information) are preceded by the hex character "1B" [ESC] and are terminated by the hex character "1A" [SUB]. Additionally, before the bulk timing data is transmitted, the day's date is sent (once) to allow the file to be named appropriately.

Note that the transmitted date format will follow the EU/U.S. convention (as set by your *Club Programmer*). The variable '*Date asUK*' controls this.

Here is the global (so completely unaffected by file protocol choices) bulk transfer format, for the 1st of Jan, 2018…

[ESC] 010118 [CrLf] … (bulk data here) … [SUB]

Real time messages can also include the date (if required) although this is typically not enabled for brevity. The variable '*Date Coms*' controls this.

Note that irrespective of how you have set **AcuSail** to display time internally, you can choose to transmit it as either Time of Day (TOD) or as Stopwatch time (i.e. referred to zero). The variable '*TOD Coms*' controls this function.

AcuSail is supplied with a custom font, which deals with arrows and flag symbols. These are defined as follows… |=➡, ^=⬅, {=⬆, }=⬇, ~=⚑.

The following examples illustrate the three communications formats available (CSV, Excel™1900 and Excel™1904). In each example the data presented describes the same event – the 1st Start, sounded at (00:00:00.0 – so Stopwatch zero) on the 1st of January 2018, which was recorded as the 1st event of the day;

In all cases, the '*event identifier*' will be either the race letter merged with the event number, or will be the event number as it occurred in the course of the day. This is set by the variable '*AtoZ Coms*'.

Note that the 10th second information will always be present, regardless of chosen protocol (even if **AcuSail** is set to not display this data).

Setting *'Coms=CSV'* to *'Yes'* will yield the following result…

00,00,00,0,ST1|,A001[CrLf]

This format has a generic comma-separated (CSV) value structure.

The first four sets of numbers are the time (Hr, Min, Sec, 10th). Then follows the event (ST1|) and finally the event identifier (A001).

If you now enable the date as well (i.e. set '*Date Coms*' to 'Yes') you will get…

01,01,18,00,00,00,0,ST1|,A001[CrLf

i.e. the exact same thing, but with the date information as a prefix to every line of the timing data (01,01,18, in this case).

Setting '*Coms=CSV'* to '*No*' and with '*Date Coms*' also set to '*No*' (i.e. to supress the date for each time transfer), the output format is as follows…

"0.000000000"[TAB]"ST1|"[TAB]"A001"[CrLf]

This format is designed for directly importing into Microsoft Excel™. The long number that starts the transfer is the time.

Once you have written a (.txt) data file to your PC, Excel™ should be able to open it with minimal user intervention (We have used tabs and double quotes to delimit the fields, as per the Excel™ defaults).

It's worth mentioning here that Excel™ has two distinct date formats, depending on whether or not you want/need to view negative times. The default Excel™ format (so that used when you open the programme) is referenced to the year 1900 and only supports positive times.

If you want/need to support negative times, you will need to set the date format within Excel™ to 1904 (file/options/advanced and check "use 1904 date system").

As you might expect, **AcuSail** supports both Excel™ date formats (selected with the "*Coms 1904*" variable).

N.B. Negative times will be changed to zero, if "Coms 1904" is set to 'No".

With '*Coms=CSV'* set to '*No*', '*Date Coms*' set to 'Yes' and with "*Coms 1904*" set to "*Yes*", the output format is as follows…

"41639"[TAB]"0.000000000"[TAB]"ST1|"[TAB]"A001"[CrLf]

In the above, 41639 is Jan 1st 2018 (in 1904 format).

Changing "*Coms 1904*" to "No", the output format is as follows…

"43101"[TAB]"0.000000000"[TAB]"ST1|"[TAB]"A001"[CrLf]

Here 43101 is Jan 1st 2018 (in 1900 format).

Light Data Format

Each second and every time a Horn or Aux Event happens, **AcuSail** will output the light status as a serial data byte. The format for this is as follows…

D7	D6	D5	D4	D3	D2	D1	D0
1	Horn	Aux	Lx#5	Lx#4	Lx#3	Lx#2	Lx#1

i.e. If the high bit of any byte is set, the remaining bits define the current status of the Horn, Aux and lights 1-5. So 11000000 (hex 'C0') is Horn 'On'.

Specifications and Guarantee

Electrical (Standard Version)

Supply Voltage (DC)	9V (min) to 34V (max), polarity protected
Supply Current @12V (ex Horn)	85mA (avg), 180mA (peak), running RR26
Supply Current @12V(inc Horn)	170mA (avg), 3.25A (peak), running RR26
Horn Outputs/Current	2 x 10A (maximum at any one time is 10A)
Horn Switching	2 x Supply voltage or 2 x isolated contact
Timing Accuracy	Better than 1/20th of a second in 12 hours
Memory Type	64Kb EEprom; Data retention > 100 years

Mechanical

Size – **AcuSail** only	219mm (L) x 144mm (W) x 104mm (H)
Size – with Horn/Battery	219mm (L) x 144mm (W) x 264mm (H)
Weight	**AcuSail** Alone 1.7Kg with Horn/Battery 5.8Kg
Water Resistance	IP64 (enclosures), IP68 (connectors/switches)

Guarantee

AcuSail and any other system components are guaranteed against electrical and mechanical failure for two years from the date of purchase. This guarantee does not cover any unit that has been subject to misuse, negligence or accident, or that has in anyway been modified.

AcuSail is designed and manufactured in the UK by The JWP Group.

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Visitors are seen strictly by appointment.

For more information on **AcuSail,** visit www.AcuSail.com.

System Variables

Text Prompt	Default	Club	System Parameter/Meaning
24hr Time	Yes		Controls if times are based on the 24hr (or the 12hr) clock
Show 10th	No		Sets whether the 10th of a second digit is viewed (during a save or memory review)
Zero 10th	Yes		Determines (in conjunction with '*10th 4 ⬇5 ⬆*'), if the 10th digit is always zeroed
10th 4 ⬇5 ⬆	No		Controls if the 10th digit is rounded up AND down or simply cleared
Pre0 Zero	No		Controls if times shown before the race start have leading zeros
Pst0 Zero	No		Controls if times shown after the race start have leading zeros
Mem0 Zero	Yes		Controls if times recalled from memory (or just captured) are shown with leading zeros
SV>3 =Rst	Yes		If '*Yes* ', holding '*Save* ' (>3sec before any race has run), will stop the clock to allow a reset
Save Exit	Yes		'Save' will exit sequence selection / 'are you sure?' pages (instead of saving the time)
Save Frze	5 sec		How long the time freezes (in seconds) when you save it (0 means till next event)
Mem Frze	10 sec		How long the time holds for (in sec) when reviewed from memory (0 means till next event)
Mem Wrap	No		Decides if the memory 'wraps' (so the last save loops around to the first), or stops at the end
Live Seq#	1		The sequence that **AcuSail** will run as the default (1-8)
Max Seq#	4		The total number of sequences that users have access to (min 1, max 8)
Save Seq#	No		Allows any change of sequence (during operation) to be stored as the new '*Live Seq#* '
Time TOD	No		Once the race starts, the clock is displayed as 'Time of Day' (instead of starting from zero)
Mem TOD	No		Saved, (i.e. in memory) times, are displayed as 'Time of Day' (instead of relative to zero)
Horn Push	0.5 sec		How long the Horn sounds for a quick push
Horn Hold	2 sec		How long the Horn sounds if held slightly longer
Horn +Aux	No		Allows both relays to operate together - N.B. you must not pull more than 10A @ once!
Aux Push	0.5 sec		How long the Aux sounds for a quick push (if assigned to work on '*Save* ')
Aux Hold	2 sec		How long the Aux sounds if held slightly longer (if assigned to work on '*Save* ')
Aux Beep	Yes		Makes **AcuSail** Beep when an Aux is triggered (as the relay might be feeding a light)
Save +Aux	No		Assigns the Aux relay to work when '*Save* ' is pressed
+30s in XX	Yes		Extends **AcuSail**'s 'normal' ten second event countdown, out to thirty seconds
X:00 Sync	Yes		Forces sequences with timed step#0s (except the 1st), to always sync to next whole minute
Race Only	Yes		Only log race starts (so exclude class and prep flags); Horn/Save times always recorded

Text Prompt	Default	Club	System Parameter/Meaning
Race A to Z	Yes		Store/show data based on current race (so Axxx, Bxxx etc.) or as a total day event (0xxx)
Race Warn	Yes		Shows a '*Race LIVE* ' warning, instead of immediately starting any sequence (after the 1st)
SeqS Warn	Yes		Shows '*Seq# STOP* ' warning (and awaits a YES/NO) if you try to stop a sequence early
Stop Warn	Yes		Shows '*Race STOP* ' warning (and awaits a YES/NO) if you try to stop a race
Extn Save	No		Enables/Disables the external '*Save* ' input (on the remote control socket)
Extn Horn	Yes		Enables/Disables the external '*Horn* ' input (on the remote control socket)
Seq1 Lock	Yes		Locks Sequence#1 so it cannot be edited
Seq2 Lock	Yes		Locks Sequence#2 so it cannot be edited
Seq3 Lock	No		Locks Sequence#3 so it cannot be edited
Seq4 Lock	No		Locks Sequence#4 so it cannot be edited
Seq5 Lock	No		Locks Sequence#5 so it cannot be edited
Seq6 Lock	No		Locks Sequence#6 so it cannot be edited
Seq7 Lock	No		Locks Sequence#7 so it cannot be edited
Seq8 Lock	No		Locks Sequence#8 so it cannot be edited
⬅*GR* ⬅ isOK	Yes		General Recall sequence is allowed
⬅*GR* ⬅ GoTo	Yes		A General Recall 'follow on' (so a 'GoTo') sequence (post the recall), should be executed
⬅*GR* ⬅ From	3		What Sequence Step a 'tagged on' Recall sequence starts from (N.B. MUST be a Wait)
Seq1 GoTo	1		Which Sequence should follows a General Recall (initiated while running Sequence#1)
Seq2 GoTo	2		Which Sequence should follows a General Recall (initiated while running Sequence#2)
Seq3 GoTo	3		Which Sequence should follows a General Recall (initiated while running Sequence#3)
Seq4 GoTo	4		Which Sequence should follows a General Recall (initiated while running Sequence#4)
Seq5 GoTo	5		Which Sequence should follows a General Recall (initiated while running Sequence#5)
Seq6 GoTo	6		Which Sequence should follows a General Recall (initiated while running Sequence#6)
Seq7 GoTo	7		Which Sequence should follows a General Recall (initiated while running Sequence#7)
Seq8 GoTo	8		Which Sequence should follows a General Recall (initiated while running Sequence#8)
⬅*GR* ⬅ LxON	54321		Defines which Light outputs are turned on during a General Recall (All is the default)
⬅*IR* ⬅ isOK	Yes		Individual Recall sequence is allowed
⬅*IR* ⬅ LxON	5-3-1		Defines which Light outputs are turned on during an Individual Recall (5+3+1 is the default)
Recl HnAx	No		Are both the Horn AND the Aux relay triggered on a Recall?

Text Prompt	Default	Club	System Parameter/Meaning
Recl Horn	3 sec		Duration of the Recall Horn(s)
Recl Wait	2 sec		Duration of the Recall Wait(s) - i.e. the silence between Horns
LEDs Live	- - - - -		Maps if the display decimal point LEDs, reflect the actual Light Outputs
LxOP Live	54321		Enables (or disables) the Light Outputs; (5-4-3-2-1) for On, (- - - - -) for Off
Usr1 +St#	Yes		Includes (or excludes) the Start# with User defined Message#1
Usr2 +St#	Yes		Includes (or excludes) the Start# with User defined Message#2
Usr3 +St#	Yes		Includes (or excludes) the Start# with User defined Message#3
Usr1 #at3	Yes		Places the start# in User defined Message#1 at the 3rd (or 4th) character
Usr2 #at3	Yes		Places the start# in User defined Message#2 at the 3rd (or 4th) character
Usr3 #at3	Yes		Places the start# in User defined Message#3 at the 3rd (or 4th) character
Usr1 St-1	No		The Start# in User defined Message#1 is one less (-1) than the current start
Usr2 St-1	No		The Start# in User defined Message#2 is one less (-1) than the current start
Usr3 St-1	No		The Start# in User defined Message#3 is one less (-1) than the current start
Usr1 Strt	No		Indicates if User defined Message#1 is specifically a start (or just a general message)
Usr2 Strt	No		Indicates if User defined Message#2 is specifically a start (or just a general message)
Usr3 Strt	No		Indicates if User defined Message#3 is specifically a start (or just a general message)
MsgW Time	6 sec		How long a wait message (triggered on a 1 sec wait) remains on show
Keep Sq<=	4		The split of sequences preserved by factory restore (e.g. if '4', then 1-4 kept, 5-8 replaced)
Pass Word	Yes		If a Password is required to change system variables and programme sequences
Date asUK	Yes		Date is displayed as DD.MM.YY (UK) or as MM.DD.YY (US)
Date Coms	No		If 'Yes', comms data (i.e. that sent to the serial port) starts with the day, date and month
AtoZ Coms	Yes		Comms data is based on current race (so Axxx, Bxxx etc.) or as a total day event (0xxx)
TOD Coms	No		Comms data is sent as 'Time of Day' (instead of relative to zero)
LxTx Coms	Yes		The status of the lights is sent (cyclically and on an event) to the comms port.
Live Coms	Yes		Any live data (so a save, horn, sequence event etc.) is sent to the comms port.
Coms =CSV	No		If 'Yes', comms data is sent as 'Comma Separated Values', if 'No' then as Excel text
Coms 1904	Yes		Corrects Excel dates to the 1904 format (i.e. to support negative values)
Baud Rate	57600		Baud Rate for serial communications
Coms Cdly	0mS		An inter-character delay (in milliseconds) for slow responding comms links
Coms Ldly	0mS		An inter-line delay (in milliseconds) for slow responding comms links