



Key / function reference chart

Mode / Key	Normal Mode	Program Mode	Set Compensation Mode
Start/Stop	Print / pause / resume. Press & hold to change channels	Print the current step	n/a
Focus	Switch enlarger on/off manually. Press & hold to set User Options	Switch enlarger on/off manually	n/a
Store	Enter Program Mode. Press and hold to start a Test Strip	Advance to next program step	n/a
Exit	Exit from a stored sequence before its end. Clear program (press and hold), if any	Return to Normal mode	Return to Normal mode
Up	Increase time by one step. Press together with Down to set Coarse stepsize	Increase time by one step.	Increase compensation by 1%
Down	Decrease time by one step	Decrease time by one step	Decrease compensation by 1%
Compensate	Switch compensation (dry-down) factor on/off. Press & hold to set factor	Switch between base and burn functions	n/a
Coarse/Fine	Change between Coarse and Fine stepsize. Press & hold for Split-Grade mode	Display total exposure time for this step	n/a



StopClock Professional StopClock Vario f-Stop Enlarger Timers Instructions for use



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Issue 6, February 2006. Software v8.5 and above*

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CONTENTS OF THE PACKAGE

The StopClock package contains the following items: the timer itself, a mains lead fitted with a plug, two IEC connectors for your enlarger and safelight, and a footswitch. If any of these items are missing or damaged contact your supplier immediately.

CAUTION

Please read these instructions carefully and fully before installing or using your StopClock.

WARNING: THIS APPLIANCE MUST BE EARTHED

The mains lead supplied with the unit is fitted with a moulded plug suitable for use with the standard mains outlets in your country. If the lead is not suitable, obtain a replacement. If this is not possible, the plug must be cut off leaving as little free lead as possible *and disposed of immediately*. Severe electric shock hazard will exist if a cut-off plug is plugged into a live outlet! A suitable replacement plug should then be fitted to the lead. If a fused plug is used, it should be fitted with a 5A fuse.

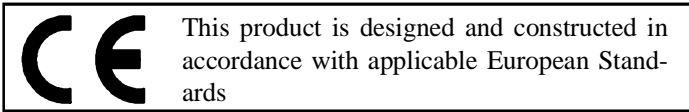
For continued protection against fire hazard, replace only with the same type and rating of fuse. (Fuse rating T4A.) Repair service is available - return the unit to RH Designs if repairs become necessary. **Do not attempt to open the unit or to remove any covers. Doing so may expose dangerous voltages.** Do not drop the unit or subject it to mechanical shock or extremes of temperature or humidity.

Like other electronic equipment, StopClock can be damaged by water or chemical spillage. Do not install this equipment where it may be subject to water or chemical spillage or splashes. Should such spillage occur, disconnect the equipment from the mains supply before attempting to clean it.

This unit is designed to control photographic enlargers and safelights only. Connection of any other type of equipment to this unit may present a safety

GUARANTEE

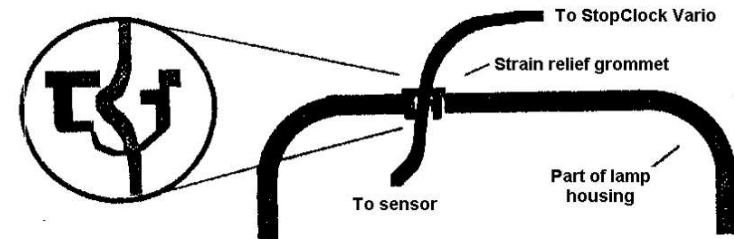
This equipment is guaranteed against faulty components or manufacture for a period of two years from the date of original purchase. Should a fault develop within this period, call RH Designs with a description of the fault. If the problem cannot be solved over the telephone we will repair or replace the equipment (at our option) at no charge. This guarantee does not affect your statutory rights. Damage due to misuse of the equipment, and any consequential loss arising out of the use of the equipment are not covered by this guarantee.



factor between 1 and 8 and as supplied from the factory this factor is set at 2. To change it, switch the StopClock on while holding down the ‘Start/stop’ key. Keep the key pressed until the indicator lights at the top of the display go out. The main display shows S C 8.3. When the key is released the display shows t 2 signifying that the scale factor is set to 2. Using the ‘Up’ and ‘Down’ buttons, set the factor to the desired value and then press ‘Exit’. The new value will be stored and the timer’s speed adjusted accordingly. **Note** - all user options will be reset to the factory settings by this procedure so if you have modified any settings you will need to re-enter them.

You can also experiment with the sensor’s position and with neutral density filters if necessary until the timer runs at a sensible speed. Note that it’s not necessary for the ‘seconds’ on the timer to be exact seconds, they are simply units of time and will shorten or lengthen accordingly to compensate for variations in the intensity of the light source.

When you are happy with the installation, secure the sensor by tightening the cable tie(s) so that it cannot be dislodged.



Use the supplied strain-relief clip (the odd shaped bit of black plastic) to secure the sensor cable so that a tug on the cable cannot damage the sensor or other parts of the light source. Use the supplied cable ties to tie the cable out of the way such that as the enlarger head is moved, the cable cannot snag or be otherwise pulled or damaged.

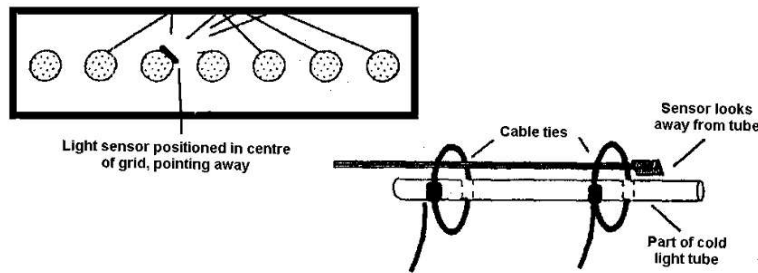


Mark a suitable place on the head where the cable entry hole will be drilled. This should be away from any internal parts which may be damaged during drilling.

Carefully drill a pilot hole with the 3mm drill bit, then enlarge to 10mm with the larger bit. Deburr the hole inside and out, and carefully remove any swarf and debris from the head.

Feed the sensor cable through the hole, passing the sensor end of the cable through the hole from outside so that the sensor ends up near the tube.

The sensor needs to see the average light level from the tube(s) and we suggest that you position it such that it points towards the diffuser and away from the tube. The sensor can be tied to the tube as in the diagram if convenient but note that the sensor's sensitive side (the side with the square blue shiny window) should normally point away from the tube. Loosely tie the sensor in position using cable ties as it may need to be relocated later.



Reassemble the light source and test the installation as follows. Plug the sensor cable into the "control" socket on the front of the StopClock. Connect power to the StopClock and the light source to the "enlarger" socket on the StopClock (note that with some light sources, there is a separate power requirement for the head and a control cable to connect to the timer). Switch on and press the "Focus" button on the StopClock. The "Sensor" indicator should illuminate. If it does not, check that the light source is illuminated and that the cables are correctly connected. Using the "Focus" button, switch on the light source again; if the indicator still remains off, it is likely that the sensor needs to see more light in which case you'll need to reposition it accordingly.

If the "Sensor" indicator comes on, switch off the light source using "Focus" and press "Start/Stop". The timer should count down as usual. If it runs too fast, the sensor is seeing too much light; if it runs slowly there's not enough light. The timer's speed can be adjusted if necessary; the speed can be divided by a



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Introduction

Thank you for choosing StopClock Professional, the most versatile and useful enlarger timer designed *by* photographers *for* photographers. With the StopClock you will learn to think of exposure time in terms of linear changes in print density, making it much easier to previsualise the effects of exposure changes and to judge the amount of burning in that might be necessary. The StopClock can store a sequence of exposures so that once a printing sequence is set up, you can run off a number of copies of the print without having to reset the timer between prints or between exposures.

The StopClock Professional builds on the experience we've gained with the original StopClock, and adds a number of important new features. We've also incorporated features suggested by our customers, and are always open to suggestions from users to be incorporated into future upgrades.

The StopClock Vario incorporates a compensation feature which, in conjunction with a light sensor, can read the light level from the enlarger lamp. If the brightness of the lamp should change, the Vario will adjust the exposure time to compensate for the change. If the lamp gets brighter, the timer will run faster, and vice versa. This feature is especially useful for cold cathode (cold light) enlargers as this type of light source can be subject to variations of intensity - this can otherwise result in inconsistent exposures and difficulties in matching the final print to the test strip. The operation of the Vario is identical to that of the standard Professional version, with some minor exceptions which will be detailed in the appropriate section of this manual.

Please spend a little time familiarising yourself with this manual and with the StopClock's controls before installing it in your darkroom, this will maximise your chances of early success with the product.

We have laid out this manual as a series of operations, beginning with the basic operation of the timer, and then progressing through making a test strip and making burn-in exposures to programming a complete printing sequence. Each operation is described diagrammatically, with detailed notes to accompany the basic description.

The following notation is used:

- Press the indicated key briefly and release
- E** Press and hold the indicated key until the display responds, then release
- F** See note regarding this key

Following the operational description there is a reference section in which the



Additional Installation instructions for the StopClock Vario

The StopClock Vario uses a light sensor to compensate for variations in the light output from the enlarger lamp. Zone VI cold lights have a sensor built-in and if you have bought the Zone VI version of the Vario a suitable cable will have been supplied with it. For other cold lights you will need to install our own light sensor as described below.

Connections for Zone VI heads

The StopClock and the enlarger head require separate mains power cords and these should be plugged into the mains as usual. Plug the supplied IEC-IEC cord's male connector into the "Enlarger" socket on the StopClock, and the other end into the "Timer" socket on the enlarger head. Plug the "stereo" jack connector of the sensor lead into the "Control" socket on the StopClock, and the other end (3-pin DIN connector) into the sensor socket on the enlarger head. Switch on the enlarger head and the StopClock, set all the controls on the head's contrast control box to "Max". Press the "Focus" button on the StopClock and check that the enlarger lamp comes on and the "Sensor" indicator on the StopClock illuminates. If so, you are ready to start printing!

Installing the sensor in other cold light heads

General Instructions

Warning! While installing the sensor ensure that the light source you are working on is completely disconnected from all power sources.

Avoid exposing the sensor or the cable to excessive heat. If it's too hot to touch, it's too hot for the sensor.

The sensor is very sensitive to changes in position; this is useful during installation to bring the timing within a suitable range but once positioned, ensure the sensor is secured so that it cannot move.

Installing the sensor in a cold light head.

You will require an electric (or hand) drill with 3mm (1/8") and 10mm (7/16") bits.

Disconnect the power and remove the enlarger head from the chassis. Place the head on the workbench. Note the orientation of any parts before removing them so that they can be correctly reassembled. Remove the cover to gain access to the tube assembly.



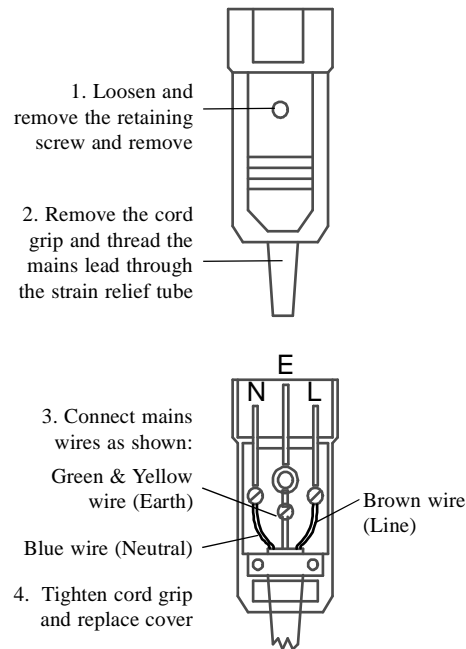
the connector, plug it into the Enlarger socket at the back of the StopClock.

Similarly, if you wish to use the automatic safelight switching facility, fit the second IEC connector to your safelight mains lead and plug it into the Safelight socket at the back of the StopClock. **NOTE:** Sodium safelights such as the Duka 50 must **NOT** be connected to the timer as they must be left switched on.

Checking the Installation

When you have completed the wiring, plug the StopClock's mains lead into a convenient socket and switch on. The display will show an initialisation sequence and the safelight (if connected) should illuminate. If it does not, or the timer display does not come on, switch off and check your wiring, and any fuses. If everything is satisfactory, press **Focus**. The safelight should now be extinguished and the enlarger bulb illuminated. Again, if it is not, or the timer display does not come on, switch off and check your wiring, and any fuses. If everything is satisfactory, you are ready to start printing. If you need any more help or information, contact RH Designs on 01969 667776. An answering service is available if we cannot take your call immediately. We can also answer questions

by fax (01969 667776) or e-mail (info@rhdesigns.co.uk). More technical support is available on our web site: <http://www.rhdesigns.co.uk>



Connector Wiring Diagram



operation of all the keys and indicators is defined, and there is an article on print dry-down by Les McLean.

Initial setting up

We suggest you read through this manual and familiarise yourself with the major functions and features of the StopClock before installing it in your darkroom

The StopClock is supplied with a mains lead fitted with a moulded plug suitable for your local mains outlets. See the **Caution** on page 2 if this plug is not suitable. Plug the lead into the receptacle at the rear of the timer and into a suitable mains outlet. Switch on by pressing the lower edge of the on-off switch (marked '1'). The display lights up, and after a short test sequence will show 16.0, signifying 16.0 seconds. If the display does not come on, check the mains supply, and try the lead on another appliance. If OK check the fuse fitted on the StopClock's rear panel and replace if necessary. If the fuse is intact, or it blows again, return the unit for service. **DO NOT** fit a larger fuse as this will compromise safety and may present a risk of fire.

Please refer to the Installation Guide at the end of the booklet for information on how to set up the product in your darkroom. The Vario version has additional installation instructions covering the light sensor.

Features

The StopClock Professional has a rich set of features to help you create fine prints, all of which have been incorporated as a result of our own experiences in the darkroom. Given that you'll be working in darkness for much of the time, we've arranged the controls and their operation in a logical manner which once mastered is very easy to use.

There are two separate timing channels. Each channel has a main exposure (called the Base Exposure) which will normally be the main exposure given to the print. Nine subsequent exposures can be set for each channel, for burning in purposes. If the Base Exposure is changed, the subsequent exposures are adjusted automatically to maintain the same density relationships between them - so you can proof at a small print size, then scale the Base Exposure for a bigger final paper size and the StopClock will automatically adjust the remaining exposures. The two channels can be used independently, or together in a "Split Grade" mode in which adjustments made to one channel will be reflected in the other in a way that allows adjustments to print highlights and shadows to be made almost independently. This is more fully explained in the section on Split Grade Printing.

Exposure time is adjustable in coarse or fine steps. The same keys are used for



both (Up and Down). The Coarse/Fine key switches between coarse and fine steps. The fine step size is 1/24th f-stop; the coarse step size can be set to your choice of 1/2, 1/3, 1/4, 1/6 or 1/12th f-stop at any time.

The Compensation feature allows the exposure time to be scaled by a factor which you can set anywhere between -20% and +20%. This is designed primarily for “dry-down” compensation - you can assess a wet test print and then press the Compensate key to adjust the time to compensate for the increase in density as the print dries. This is a real time saver! The feature can also be used to compensate for subsequent toning processes - many of these processes require print density to be adjusted prior to toning to avoid loss of highlight or shadow detail.

Other features include an audible tick, dimmable display, alternative test-strip modes, a lamp saver, and selectable safelight switching. The standard version can also be connected to our ZoneMaster Enlarging Exposure Meter, when the meter’s computed exposure time will automatically be set on the StopClock. (This feature is not available on the Vario version.)

The Keypad and Display

The front panel of the StopClock is illustrated below. There are eight keys which will be referred to throughout this booklet by the names in **Roman** script on the panel. The names in *Italic* script indicate secondary functions of each key.

The display comprises 4 LED digits, the leftmost indicates the step number in a multi-step exposure sequence. The three rightmost digits indicate the time. Depending on the total time set, this display will be in seconds, tenths or hundredths of seconds.

Additionally there are nine indicator LEDs as follows:



Installation Guide

CAUTION: Like other electronic equipment, StopClock can be damaged by water or chemical spillage. Do not install this equipment where it may be subject to water or chemical spillage or splashes. Should such spillage occur, disconnect the equipment from the mains supply before attempting to clean it. Do not install this equipment where it may be subjected to extremes of temperature or humidity.

A wall-mounting kit is available as an option, or you may make your own - the threaded holes in the base of the unit take M4 screws, maximum length 6.0mm.

Conventional Enlargers

StopClock functions as a mains switch, and in most cases installation simply consists of connecting the timer to the mains, and then connecting the enlarger’s mains lead to the socket at the rear of the unit. Most conventional enlargers use low voltage bulbs fed from a transformer (e.g. Durst, LPL etc.), and StopClock can control such loads of up to 750W (most enlargers are 100 - 250W). The Leitz Focomat has a built-in transformer and can be connected directly. If your enlarger is of this type, go to “Connecting your enlarger and safelight”.

Cold Cathode Enlargers

Most Cold Cathode enlargers can be safely controlled by StopClock; the timer’s internal relays can cope with the high switch-on currents and voltage spikes generated by such enlargers. The maximum rating of the relays is 10A surge. If you are in doubt, consult the manufacturer of your enlarger, or RH Designs direct.

Stabilisers

Most voltage stabilisers are suitable for use with StopClock. The De Vere Transtab unit has connections for a timer; we can supply a ready made lead or alternatively a data sheet is available from us giving connection details. If you are in doubt, consult the manufacturer of your stabiliser, or RH Designs direct. If you use a stabiliser refer to the section on “Soft-Start Delay”.

Connecting Your Enlarger and Safelight

CAUTION: Before proceeding further, in the interests of safety disconnect StopClock’s mains lead from the supply socket.

In most cases, you will need to remove the existing mains plug from your enlarger and replace it with one of the IEC connectors supplied with the StopClock. A wiring diagram is shown opposite. If you are in any doubt as to how safely to wire up the connectors, consult a qualified electrician. When you have fitted



exposure.

Press and hold Coarse/Fine until the display shows SPLT followed by on. The StopClock will calculate and display the effective paper grade in tenths of a grade briefly, e.g. "G 2.0" and then display SOFT before once more showing the soft exposure time. While Split-Grade mode is set, changes to the exposure in Channel 1 will be reflected in Channel 2, thus maintaining the ratio and therefore the print contrast. However, if Channel 2 exposure is altered, Channel 1 is not affected; the display will show the new effective grade and then the new exposure time.

A contrast test strip can be made easily if required. Firstly expose the whole of the test print to the soft exposure previously established. Now switch to Channel 2 and set the exposure to the minimum equivalent grade - e.g. If you want to start at "grade 1" set Ch 2 to one stop less than Ch 1. Set Ch 2 stepsize to 1/2 stop and make a test strip in the usual way through the hard filter. When you have finished, you will have a test strip in approximately half-grade steps and can then choose the appropriate hard exposure.

You can refine the exposure and contrast of the print by making small adjustments to Channel 1 (exposure) and Channel 2 (contrast) until you're happy with the result.

A test print can be made on a small piece of paper if required; to make the final larger print it is necessary only to change the time on channel 1 to correct the exposure - channel 2 will be set automatically to maintain the same contrast. When changing channels, the display will briefly remind you whether you are switching to SOFT or HARD exposures. Press and hold "Coarse/Fine" again to exit this mode.

Split-Grade Dodging and Burning

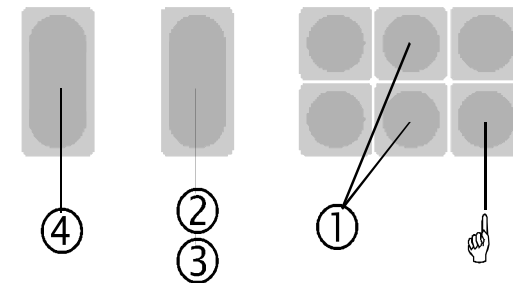
Because the highlights and shadows are controlled by the soft and hard exposures respectively, it is possible to control contrast locally by dodging and burning. To lighten a shadow area, dodge during the hard exposure. To darken a highlight area, burn in during the soft exposure. If you want to burn in an area without affecting contrast, you'll need to burn in on both channels by the same amount.

Using these methods it's possible to gain very fine control over all aspects of your print, and of course the StopClock will remember the exposure sequences so you can make more than one copy of the final print if you wish.



Channel	(Two LEDs) One LED lit indicates Channel 1 is in use, both lit indicates Channel 2
Prog	The unit is in Program mode
Split	The unit is in Split Grade mode
Base	The current program step is a Base exposure
Fine	Time is being set in Fine (1/24 stop) steps
ZM	(standard model only) A ZoneMaster is connected correctly
Sensor	(Vario only) The timer compensation mode is active
Lin	The unit is in linear (seconds) mode
+/-	(Flashes) Compensation is active

Basic Operation



- Set the time: Press Up to increase the time by one step, press Down to decrease the time by one step. The stepsize is 1/4 stop, or the currently set coarse stepsize (See Changing the Stepsize)
- F** Press the Coarse/fine key to switch between coarse and fine stepsize. The Fine indicator lights when Fine stepsize is in use. Fine stepsize is always 1/24 stop. When switching back to coarse stepsize, the coarse stepsize previously in use will be restored.
- ,** Press Focus to switch on the enlarger. Compose and focus the image.
- f** Press Focus to switch off the enlarger. Place your paper on the easel.
- "** Press Start/Stop to begin the exposure for the indicated time.

Notes

On the Vario model only, when the Focus key is pressed to switch on the enlarger the light sensor is checked. If the sensor is connected and working the "Sensor" LED will illuminate and the compensation feature activated. Compensation will remain activated unless (or until) the sensor is disconnected. If the sensor is either disconnected or not working properly when Focus is pressed, the "Sensor"



LED will not illuminate and the compensation feature will be disabled. If the compensation is not active, the Vario operates in standard “seconds” mode identically to the standard Professional. This means that for example the Vario can be used on a second enlarger which doesn't require the compensation feature.

The Up and Down keys have auto-repeat. Holding the key down causes the time to change continuously until the key is released.

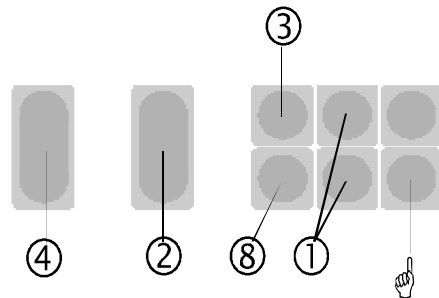
The Start/Stop key has a pause and resume function. While an exposure is in progress, press Start/Stop to pause; the enlarger is switched off. Press Start/Stop again to resume. This feature can be used repeatedly if required.

During an exposure, or while an exposure is paused, press any key other than Start/Stop and Focus to abort.

The footswitch exactly replicates the operation of the Start/Stop key; either may be used in place of the other at any time. Do not plug in or unplug the footswitch if the unit is switched on, this may start an unwanted exposure.

While an exposure sequence is paused, pressing Focus switches the enlarger on. Any key (including Start/Stop) will switch it off again ready for the next timed exposure. This can be useful for positioning dodgers etc.

Making a Test Strip



- Set the time: Press Up to increase the time by one step, press Down to decrease the time by one step. The test strip interval is 1/4 stop, or the currently set coarse (or fine) stepsize (See Changing the Stepsize)

F Press the Coarse/fine key to switch between coarse and fine stepsize. The Fine indicator lights when Fine stepsize is in use. Fine stepsize is always 1/24 stop. When switching back to coarse stepsize, the coarse stepsize previously in use will be restored.



Have faith and print well. A correctly exposed and processed black and white print should glow with clean delicate highlights and rich luminous shadows which show just a hint of separation in the darkest part.

Les McLean

January 2000

Split-Grade Printing on Variable Contrast Paper

Split-Grade printing is a technique of printing on variable contrast (‘Multigrade’) black and white papers in which the highlights are printed using a very soft grade and the shadows printed in separately using a very hard grade. The technique allows the correct exposure *and contrast* to be established for the negative. The two channels of the StopClock make this very straightforward since one channel can be used for the soft exposures and the other for the hard.

To a first approximation, the soft exposure controls the overall brightness of the print and can be used to adjust highlight density, and the hard exposure controls the contrast of the print and can be used to adjust the shadow density. Effectively therefore you have control of the highlights and shadows separately and this eases the problem of establishing the correct contrast grade for the particular print. Equal exposures through grade 00 and grade 5 filters produce a contrast equivalent to a single exposure through a grade 2 filter. Interestingly, an adjustment of one stop to the hard exposure produces a change in contrast of approximately a full grade. So if the hard exposure is one stop less than the soft, the result is the same as a single exposure at grade 1, and if it's one stop more that's equivalent to grade 3, and so on. Small adjustments to the soft exposure may be necessary when changing contrast in this way to maintain the highlight density but over the medium contrast range (grade 1 to 3) this is minimal.

You will readily see therefore that by adjusting the ratio of hard and soft exposures, you have continuous fine control of contrast down to 1/24th of a grade! The StopClock's split-grade mode has been designed to help you get the best from split-grade printing with minimum effort.

To get the best from the StopClock's split-grade mode, Channel 1 should be used for soft exposures and Channel 2 for hard. Using Channel 1 and a soft (e.g. Grade 0 or 00) filter, establish an exposure for the highlights. When you examine the test strip, ignore all the image except for the bright highlights. When you've decided on the soft exposure, we recommend you switch to Channel 2 and set it to the same exposure time as Channel 1, so you start off with a grade 2



darkroom wastebasket. The wet print looks bright and glows, but the following morning the highlights in the dried print are dull and the image lacks the contrast and bite of the previous evening. This is the demon dry down at work. It will affect all papers but is likely to affect fibre more than RC. All papers dry down differently therefore it is advisable to carry out the following simple test on each paper to determine the correct factor.

How to calculate the dry-down factor

Select a negative with a good range of tones and make a straight print with no burning and dodging which, when wet, shows the highlight as you wish it to be in the final dried print. Make a second identical print. Identify them with a number 1 and 2 on the back. Make a note of the exposure time.

Ensure that the correct exposure time is set on the StopClock. Press the compensate key to activate the dry down function. Set the compensation factor to -08 and make a straight print. Mark 8% on the back of the print. Follow this procedure using 9, 10, 11, and 12% and remember to mark each print with the dry down factor used. After fixing wash as normal. Dry all prints except the one marked number 1, which should be left in a holding tray of fresh water. I use a microwave in the kitchen to speed up the drying process.

Assessing the results

Compare the dried prints with the print left in the holding tray. Comparison of the wet number 1 print with the dry number 2 print will illustrate the extent of the dry down. The dry down factor for the paper tested is the percentage shown on the back of the dried print that matches the wet print in the holding tray. Thereafter, when using this paper, dial into the StopClock this percentage and switch the compensation on ONLY when making the exposure for the final print.

A few tips

It is not necessary to make large prints for this test, I cut a 10" x 8" sheet of paper into 4 and make small prints. The dry down factor does not change with paper size. In the 25 years that I've been making prints I have found that the dry down factor for fibre papers is likely to fall between 8 and 12%. (RC papers are often less than this.) I test all papers I use every 12 months as paper characteristics can change.

Remember that the final print will look lighter than the test strip when wet. It will dry down to the chosen density so don't be tempted to make a second, slightly darker, print. My final prints have no tone at all in the highlights when wet.

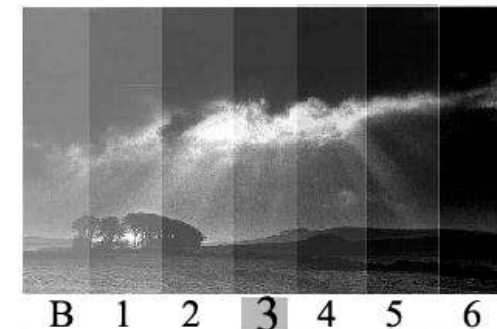


- ,
- f Press Focus to switch on the enlarger. Compose and focus the image
- " Press and hold Store to enter Test Strip mode
- " Press Start/Stop to begin the first exposure - expose the whole of the paper for the indicated time.
- ... Cover a strip of the paper. Press Start/Stop to begin the first incremental test strip exposure.
- † Cover another strip of the paper. Press Start/Stop to begin the next incremental exposure.
- ‡ Repeat † until either the whole of the paper is covered or you have made the desired number of exposures.
- ^ Press Exit to exit the sequence at any time; the total number of exposures will be displayed for a short period.

Notes

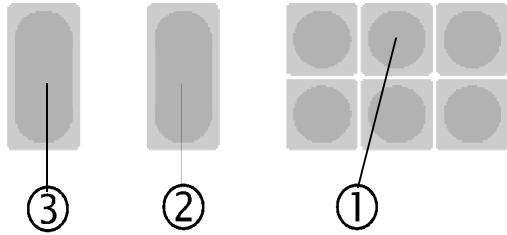
The test strip interval is the same as the coarse stepsize. Set this to the desired value if required before starting the sequence (see Changing the Stepsize). Always progressively cover the paper. Progressively *uncovering* it will not give the desired result. For an alternative test strip sequence see p.18, User Options.

Assessing the Test Strip and choosing a Base Exposure



Choose the optimum exposure and count the number of increments from the Base (indicated by "B" in the diagram above) that it represents. In this example, the third increment is adjudged the best. To make a print, proceed as follows:

- Press Up the number of times that you determined from the test strip. In the example, this would be three times.



- , Press Focus to switch on the enlarger. Compose and focus the image. Press again to switch off the enlarger. Place your paper on the easel
- f Press Start/Stop to begin the exposure.

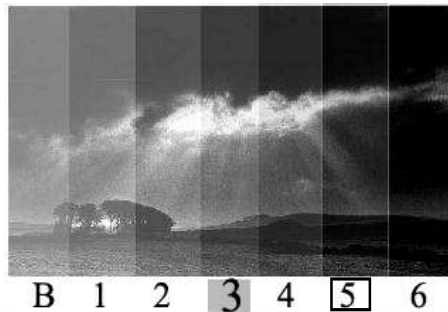
Notes

Because the StopClock operates in constant density intervals, there is a direct relationship between the test strip and the Time Set keys. You will have noticed from the test strip that the changes in density across it are consistent, so you can learn to predict density changes and relate them to keypresses.

A complete test strip sequence starts with the Base Exposure and comprises any number of exposures (subject to a maximum of 240sec for any one step) each one being one coarse stepsize longer than the previous one. To abort the test strip sequence, press Exit at any time when the sequence is paused between exposures.

Burning in an Area

In the example based on the test strip made earlier, we'll choose exposure 3 for the Base Exposure, and exposure 5 for the sky area to add impact. The instructions below assume the time has been set for the Base Exposure as before, i.e. to the time corresponding to 3 on the test strip.



- Press Start/Stop to make the Base Exposure. Press Store. The Prog lamp lights.
- , The burn-in time is equivalent to an increase from test strip 3 to test strip 5, i.e. two increments, so press Up twice. The time display shows the time difference between test strip exposures 3 and 5. The Step display shows 1.



will sound every second during an exposure.

Test Strip mode. StopClock offers two alternative test strip sequences. As standard, test strip mode is set to "Incremental" which operates as described in "Making a Test Strip". In "Separate" mode, StopClock will time a sequence of complete exposures so that complete prints can be made with gradually increasing exposure. Users of the Quadro proofing easel and similar techniques will find this mode more useful than Incremental Mode.

At the completion of each exposure in a test strip sequence, the total exposure for the next step is displayed briefly, followed by the time of the next step only. A beep sounds at the end of the sequence.

NOTE: If a ZoneMaster is connected (StopClock Professional only), the Test Strip mode is changed to 7 exposures in total, 3 shorter, the currently set exposure, and 3 longer. This matches the ZoneMaster and eases both use and calibration when the meter is connected.

Safelight Mode. Switches the safelight between "auto" (off when the enlarger is on) or "on" (safelight is left on permanently)

Default switch-on time and coarse stepsize. As shipped from the factory, the StopClock is set up with a switch-on time of 16.0 seconds and a coarse stepsize of 1/4th stop. In User Mode you can change either or both of these settings. Using the Up and Down buttons, set the desired time and stepsize in the usual way; when User mode is exited, these settings will be stored and set automatically when the StopClock is next switched on. Note that there is only one setting for coarse stepsize at switch-on; both channels will initially use this setting.

Soft-Start Delay. Some voltage stabilisers, for example certain Durst and Kaiser models, exhibit a delay of approximately 0.5 seconds after power is switched on before the lamp lights. This will adversely affect the accuracy of each exposure, especially at short exposure times, and will make it impossible to match a complete exposure to a test strip. The StopClock can compensate for this delay and insert its own 0.5 second wait before it starts to count down. This option sets the delay on or off.

Exiting User Mode. Press Exit to save your settings and return to normal mode.

Dry-Down Compensation by Les McLean.

What is Dry-Down?

Dry down is the phenomenon responsible for many prints being confined to the



exposure will be for the whole of the paper. The second exposure should be given to the whole of the paper except the area to be dodged. Only one dodging exposure can be set up in this manner - it is often easier to regard the shortest exposure as the Base Exposure and all subsequent exposures as burning in. A dodge is really a burn-in of the whole image except the area to be dodged.

Display indications during programming

When you first press Store, the display briefly shows 0. Prg, followed by a reminder of the stepsize in use. It then settles to show 1 0.00, i.e. step 1, time zero. If you now press Up, the display shows c and a number - this number is the length of the step in 1/12ths of a stop. If the stepsize is 1/4th, the number will be 03. Release the Up key and the display shows the equivalent in seconds. Press and hold Coarse/Fine to show the total time, in seconds, of this current exposure step - i.e. the sum of the length of the step plus the Base exposure. Release the key to show the length of the step only.

Editing and clearing a program

If a program is already stored, pressing Store will sequence through it, displaying the length of each step. (While in this mode, you can also press Start/Stop to switch on the enlarger for the currently displayed time.) The step can be altered in length using Up and Down. A step cannot be deleted once entered; setting it to zero length will be interpreted as the end of the sequence and subsequent steps if any will be ignored.

Press Exit to return to normal mode. If the unit is in normal mode, press and hold Exit to erase the program completely.

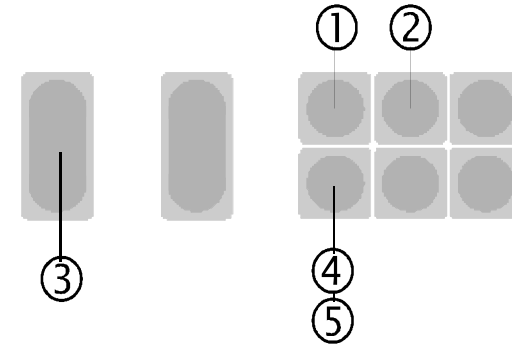
More about User Options

There are a number of optional features in the StopClock which can be set by the user and which will be stored when the unit is switched off. This allows you to set up your StopClock to cater for your preferences. To enter User Options mode, press and hold the Focus key until the display shows User. Press Focus again to step through the options, and Up or Down to select the settings for each option.

Lamp Saver. To protect your enlarger's lamp in case you inadvertently leave it in Focus mode, the StopClock will switch it off after five minutes. This may be undesirable for cold light users so it can be disabled.

Display Dimming. The display can be set to any of three brightness levels.

Audible Beep. Switches the seconds beep on or off. When switched on, a tick



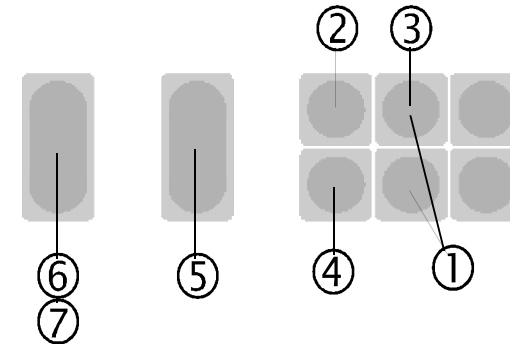
- f* Mask off the area not to be burned in and press Start/Stop to begin the burn-in exposure.
- n* Press Exit to return to Base Exposure.

At this point, you have actually entered a program into the StopClock's memory (refer to the next section for more information about programs). You can retain this program and make a second print. Press Start/Stop to make the Base Exposure; when complete, press it again to make the burn-in exposure. You can repeat this as often as necessary. When you no longer need the program -

... Press and hold Exit to clear.

Programming a complete printing sequence

The StopClock can store up to nine burn-in exposures in each of its two channels, allowing easy set-up of a complex sequence of exposures.



- Set the Base Exposure time.
- , Press Store to enter the Program mode. The Prog indicator illuminates.



- f* Set the desired burn-in exposure time.
- If you want to enter more than one burn-in exposure, repeat *,* and *f* .
- „* Press Exit to exit Program mode.
- ...* Compose and focus the image
- †* Press Start/Stop to make the Base exposure.
- ‡* Mask all but the first area to be burned in and press Start/Stop to begin the first burn-in exposure. If you have programmed more than one burn-in time, repeat this step as necessary until the end of the sequence. The Step indicator then reads 0, ready to repeat the sequence if required.

Notes

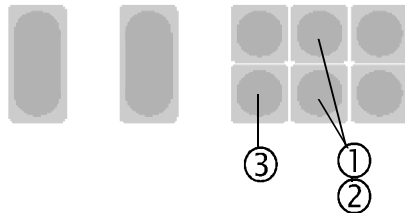
Burn-in times can be set only in coarse steps; the Fine mode is not available. (Burn-in exposures are by their nature less critical than the Base exposure.) The stepsize can be changed during programming if desired.

When Program mode is entered, the display briefly shows PrG followed by the currently set stepsize as a reminder. While the Up and Down keys are depressed, the display shows the burn-in time in 1/12 stop increments. For example a display of C 04 indicates a burn-in time of 4/12, or 1/3 stop.

While in Program mode, press and hold the Coarse/Fine key to see the total exposure time for the current step in seconds (i.e. Base exposure + burn-in time).

At any time during programming you can press Start/Stop to begin an exposure of the current step.

Changing the Coarse Stepsize



- Press Up and Down simultaneously. The display shows the currently set stepsize (e.g. 4 th).
- ,* Press Up to increase the stepsize; press Down to decrease the stepsize. The sequence is 12th, 6th, 4th, 3rd, 2nd, Lin. Lin signifies the Linear



The amount of burning-in required is judged from the test strip as usual, and again if you think in terms of by how many intervals on the test strip the exposure needs to be increased, that is the number of times you need to press Up when programming the step.

Program steps are all calculated relative to the Base Exposure and so can be judged independently of one another. For example, if you wanted to give a 1/4th stop edge burn to a print, you can set up four program steps each of 1/4th stop. As an alternative, you can make the base exposure and then enter Store mode, set a time of +1/4th stop, and then press Start/Stop to make the exposure and repeat as necessary.

The Base/Burn function

A slightly different situation arises when you want to burn in a smaller part of an area that has already received a burn-in exposure. You need to tell the StopClock that the next burn-in will be relative to the total exposure for this area and not just to the Base. To do this, firstly program the step, and then press Compensate. The Base indicator illuminates, and subsequent steps will be calculated relative to the sum of the base exposure and the current burn-in.

As an example, consider the test strip shown. We'll give the foreground the base exposure, the middle sky area +2, and the upper sky area +5. The first program step is easy, it's simply +2. The second one however is +3 relative to the previous step, or +5 over Base. You could burn in the two areas separately for +2 and +5, but you'd risk the appearance of a join - it would be better to burn in the top part of the sky on top of the burn-in already given to it. This is +3, but it's relative to a total exposure of Base+2, not Base alone. So set the program up as follows:

Press Store, then Up twice for the first burn-in. This exposure is to be used as a new base for the second burn-in so press Compensate; the Base indicator illuminates. Press Store, then Up three times. Press Exit to return to normal mode. To make the print, expose the whole of the paper for the Base exposure. Mask off the foreground and burn in the whole of the sky for step 1. Now mask off all but the top of the sky and burn in for step 2.

Dodging

To set a dodging exposure time, proceed as follows. Reduce the Base Exposure by the desired dodge time (e.g. 1/2 stop). Press Store to enter Program Mode, and press Up to set a time equal to the dodge (1/2 stop again in this example). Press Compensate to tell the StopClock that this is now the Base Exposure. Enter any further burn-in times in the usual way. When you make the print, the first



steps 4 and 5 on your test strip. No need to even think about how many seconds are required - just the density you want on the final print.

The Linear time mode

Setting the stepsize to Lin causes the StopClock to operate in pure seconds. This mode is very limited - only one channel is available and it is not possible to generate test strips or program exposure sequences. It is provided for those odd occasions when a seconds timer is necessary - in normal photographic printing a change of 1/24th stop is barely noticeable even at hard paper grades. The full power of the StopClock is only available in f-stop mode, to encourage you to use it!

Changing channels

To change channels, press and hold Start/Stop until the display shows Ch 1 or Ch 2 as appropriate, then release the key. StopClock also beeps once on entry to Channel 1 and twice on entry to Channel 2, as an audible reminder. Each channel has completely independent base and burn-in exposures. A program stored in one channel is retained while the other is being used. N.B. The two channels can have different coarse step sizes.

The dual channel feature is especially useful for Split-Grade printing, a method of using variable contrast paper in which the highlights are printed at a soft grade and the shadows separately at a hard grade (see Split-Grade Printing).

More about Programming

The ability to store a sequence of exposures is one of the StopClock's most powerful features. With the room lights on you can examine a proof print and decide on any burning-in that is required and set up the timer with a sequence of exposures so you don't need to remember the times or reset the timer when making the print. A print can be built up from several exposures and these will be stored and executed in sequence. As a consequence, once a complex print sequence is stored in the timer, a number of copies of the print can be produced without the need to reset the timer either between exposures or between complete prints. If a proof print is made at a small paper size, a larger one with identical density relationships can be made simply by adjusting the base exposure - the timer recalculates all the burn-in exposures automatically.



0 1 2 3 4 5



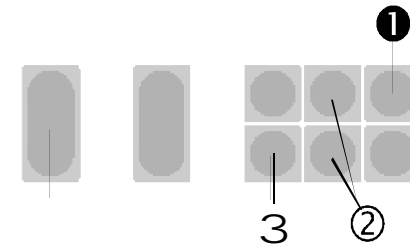
mode in which time is set in seconds directly. This mode is very limited - see the reference section.

f Press Exit to store the new stepsize and return to normal mode.

Notes

Changes made as above are temporary and will be lost when the StopClock is switched off. For a permanent change which will be stored, see User Options.

Setting and using Compensation



The compensation feature allows the exposure to be adjusted by a percentage factor; this is useful to correct for print dry-down for example (See Les McLean's article on page 19). *This feature should not be confused with the light-level compensation feature of the Vario version.* As shipped from the factory, the compensation is set to zero. To set a compensation factor:

- C* Press and hold the Compensate key until the display shows c 00. Release the key. (If a compensation has already been set, the display will show the current value in place of 00)
- ,* Use the Up and Down keys to set the desired compensation in percent. A suggested starting point for dry-down is -09%. See the reference section for more information.
- f* Press Exit to save the settings and return to normal mode.

To apply the compensation factor to an exposure, press Compensate briefly. The +/- indicator flashes. Press the key again to return to normal. The compensation settings are saved when the StopClock is switched off.

Setting User Options

Various aspects of the StopClock's operation can be changed and your preferences stored permanently as User Options. Such options include the default coarse stepsize, the time set at switch-on, the test strip mode and so on. Full



details of these options are to be found in the reference section.

To set the User Options press and hold the Focus key until the display shows USER. Release the key. Pressing Focus again steps through the available options in the sequence below. Press Up or Down to change the setting:

Display shows:	Options:
SAVE	toggles the Lamp Saver mode OFF and ON
DISP	sets the display brightness to one of three levels
BEEP	toggles the seconds tick OFF and ON
TEST	sets INCRemental or SEParate test strip exposures
SAFE	toggles the safelight switching between AUTO and ON
<STEP SIZE>	sets the step size at switch-on (factory setting "4th")
SECS	sets the exposure time at switch-on (factory setting 16.0 sec)
DLY	toggles the soft-start delay ON and OFF
<Exit>	press Exit at any time to save your changes and exit

To clear all the User Options back to the factory settings, switch off the StopClock, then hold down the Start/Stop key and switch the unit on again. Keep the Start/Stop key pressed until the row of indicators at the top of the display go out, and the time display shows t 2. Now press Exit. The factory settings will be restored.

Reference Section

This section contains fuller descriptions of certain aspects of the StopClock Professional's operation, together with detailed information about programming, split grade printing and dry-down compensation.

The display indicators

Channel

Two LEDs are used to indicate which channel is in use. One illuminates for Channel One and both for Channel Two, so you can tell at a quick glance which is in use.

Prog

Illuminates whenever the StopClock is in Program mode - i.e. when you are storing a program or stepping through it using the Store key. It does not illuminate when executing a program.



Split

Illuminates whenever the StopClock is in Split Grade mode.

Base

During programming, this indicates that the current step is to be regarded as a new Base Exposure (see More about Programming)

Fine

Illuminates when the Fine stepsize of 1/24 stop is in use.

ZM (*StopClock Professional*)

When a ZoneMaster enlarging meter is connected, this indicator lights to confirm the connection is working properly.

Sensor (*StopClock Vario*)

When the light sensor is connected and has been detected (by switching on the enlarger using the Focus key) this indicator lights.

Lin

Illuminates when the Linear time mode is in use.

+/-

Flashes when a compensation factor is in use.

More about setting the time

For large changes to the time setting, it's convenient to change the stepsize to say 1/2 or 1/3 stops. At 1/2 stop for example, the entire time range can be covered in 15 steps. Once the approximate time has been reached, change back to a finer stepsize. The Fine stepsize of 1/24 stop is a division of all the coarse stepsizes, e.g. there are eight 24ths in 1/3 stop, two 24ths in 1/12 and so on; this makes it easy to choose a setting between two increments on a test strip. After a bit of practice you will find yourself thinking purely in density steps and forgetting about the actual seconds equivalent altogether! Once this happens you will really start to benefit from the control the StopClock offers over your printing.

When switching between coarse and fine stepsizes, the display briefly reminds you of the stepsize in use, and the Fine indicator illuminates while 1/24ths are in use. Each of the two timing channels can have a different step size.

A fundamental advantage of the StopClock is the relationship between test strip intervals and the time setting keys. If the stepsize isn't changed between making a test strip and setting the new exposure time based on it, then one press of the Up or Down key is equivalent to one step on the test strip. With practice, you will find that you can judge finer changes than those shown on the test strip - for example, say you have a test strip in 1/4th stop intervals, and the correct exposure looks to be halfway between steps 4 and 5. Press Up four times; this will set the time for step 4 on the test strip. Now switch to Fine. There are six 24ths in 1/4th, so press Up another three times to set a time halfway between