DARKROOM AUTOMATION

MEMORY f-STOP TIMER
INSTRUCTION MANUAL

CONTENTS

INSTALLATION

Power: 90 – 130 VAC, 60Hz nominal.

Enlarger: 300 watts maximum incandescent or cold light. If more wattage is needed then the enlarger should be wired through a contactor with the timer controlling the contactor coil.

Safelight: 100 watts maximum incandescent. Do not use sodium vapor or fluorescent safelights as they are not designed for rapid on-off cycling.

Footswitch: Optional: momentary logic-level contact, 1/8" miniature phone plug.   Do not use a footswitch designed for controlling AC power.

NOTES ON THE MANUAL

A colored OCR font is used to illustrate the timer's display – t0.5.

The display on the timer may look a bit different from the manual because the timer's 7-segment displays can only approximate some alphabetical characters. The case of characters is mixed to make letters unique: "A" is shown as "A" and "R" is shown as "r". "M" and "N" are both represented as a small upside down "u", "%" looks like ⌐., "K" looks like ⊢. . The letters "O" and "I" are displayed in lower case as "i" and "o" to differentiate them from the numbers "1" and "0".

The manual shows examples of the timer's displays. The values shown are for illustration. In use the display would show the values you have entered. The manual may show b0.5 (a half-stop burn) but in use the display will show the burn exposure you will be using for your print: b1.2, b2.3, b0.2 ... Usually only the prompt characters – the b in b0.5 or the E in 1E2. – are important to the instructions.

DISPLAY AND CONTROLS

Display

The timer has a 3-digit LED display that is safe for all B&W print materials.

In many displays the last two digits in the LED display show the exposure setting directly in stops. Stops are related to time as follows:

Display in stops	Exposure time in seconds
0.0	1.0
1.0	2.0
2.0	4.0
3.0	8.0
3.1	8.6
3.2	9.2
...	...
9.8	891.4
9.9	955.4

It is possible to set negative stops in some instances. **-1.0** stops is 1/2 a second, **-2.0** stops is 1/4 second and so on.   Exposure times of less than a second should be avoided unless the enlarger is equipped with a shutter.

Although not normally needed, a table of stops to seconds is provided in the appendix.

In basic mode the first digit in the display normally shows the type of exposure,:

2.0	Base exposure of 2 stops - note there is no first letter
b1.0	Burn 1 stop
d0.5	Dodge 0.5 stop
p1.5	Progressive burn-within-a-burn of 1.5 stops
t0.5	Test strips in 0.5 stop increments

Other displays in basic mode are:

Foc.	Focus
m 1	Select memory bank 1
Fin.	Finish a dodge exposure
r≡.Y r≡.n	Reset a progressive burn sequence - Yes / No

Memory mode has it's own set of displays and they are covered in the chapter on the timer's memory features.

The display counts down the remaining time in seconds when an exposure is made. When the timer is paused the display flashes with the remaining time.

Keys

Notes on Key Operation:

- Tapping or hitting a key means pushing the key down momentarily – just as you would tap a key on a keyboard. The timer often acts on the release stroke in order to differentiate a tapped key from a held key.
- Holding a key means holding the key down for one second until the timer responds.

Expose Key: Starburst – starts, pauses and cancels exposures and places the timer in focusing mode.

Exposing:
- Start the displayed exposure by hitting the expose key when the timer is idle.
- Cancel an exposure by holding the expose key down when exposing

Pausing:
- Pause an exposure by hitting (and not holding) the expose key.
- Resume a paused exposure by hitting the expose key
- Cancel a paused exposure by holding the expose key down

Focusing:
- Focus by holding the expose key down when the timer is idle
- Turn off focus by hitting the expose key.

There is a timeout on focusing. The factory default setting is 5 minutes. The timeout can be disabled, enabled and set from 1 to 99 minutes in setup mode.

Footswitch: The optional footswitch works just like the expose key to expose, pause and focus.

Menu Key: Circular Arrow – cycles the timer through the current choices when hit; changes modes when held down.

Raise and Lower Keys: Up and Down Arrows – adjust the displayed exposure; make selections like yes/no; scroll through a list of choices or memory steps.

BASIC MODE

Introduction

The timer has four Modes – Basic, Memory, Setup & Seconds. This section deals with basic mode. Subsequent sections deal with other timer modes.

The timer is normally in basic f-stop timing mode when you turn it on. The timer will turn on in seconds mode if so enabled, see the chapters on setup and seconds mode.

Basic mode is for manual print making. You enter the value for the print's exposure and hit the expose key to make the exposure.

Hitting the menu key cycles you through the functions available in basic mode:

- Base exposure – **2.0** – exposure given to the entire print.

- Dodge exposure – **d0.5** – number of stops to be held back for dodging.

- Finish dodge exposure – **Fin.** – make the undodged remnant of the base exposure. Only active after a dodge exposure.

- Burn exposure – **b1.0** – additional stops exposure given to a burn-in area.

- Progressive burn exposure – **P1.0** – additional stops of exposure to burn within a previously burned area. Only active if a burn exposure has been made.

- Reset progressive exposure – **r⸛.y r⸛.n** – reset the progressive burn sequence to the last burn exposure – this only appears when hitting the menu key at the completion of a progressive burn.

- Test strip exposure – **t0.5** – make a series of test strips/prints. Only active after making a base exposure and disabled by dodge and burn exposures.

- Select memory bank/enter memory mode – **m 1** – select the memory bank to use. Enter memory mode by holding the menu key down for 1 second.

- Paper speed adjustment – **J0.0** – stops of exposure adjustment to compensate for changes in paper speed as the paper ages/a new box is opened. Only active if adjustments have been enabled in setup mode.

- Drydown adjustment - **% 0** - percentage decrease in exposure to compensate for print darkening when drying. Only active if drydown has been enabled in setup mode.

To speed cycling through the basic menu, some items - **m 1**, **j0.0** and **% 0** - are skipped after a base exposure has been made - just cycle through the menu one more time to see them.

The factory default settings enable memory mode, paper speed adjustment and drydown.

From basic mode you can:

Enter memory mode by holding down the menu key when the memory selection - **m 1** - is showing.

Enter setup mode from the other basic mode displays - **2.0**, **d0.5**, **b1.0** etc. - by holding the menu key down. Seconds mode is accessed via setup mode.

Base Exposure

Turn the timer on with the power switch. The display will show **2.0** stops. The burn, test strip, and dodge times will be reset to their nominal values. The safelight will be on and the enlarger off. The safelight is always on if the enlarger is off and vice-versa.

The steps in making the base exposure are:

1. Focus by holding the expose key down until the enlarger turns on and the safelight turns off. The display will show **Foc.**. Tap the expose key to turn the enlarger back off.

2. Set the exposure with the up and down keys. The display will show **2.0**, **2.1**, **2.2** ... Holding the key down ramps the setting.

3. Press the expose key to start the exposure: the enlarger turns on, the safelight turns off and the display counts down the remaining seconds.

Dodging

The timer automates the timing of one or more dodges. It can seperate multiple dodges into a set of progressive dodges so that they all fit into the base exposure time. Without this feature a 1.0 stop dodge and a 1.5 stop dodge would require holding back 50% of the exposure for the first dodge and then attempting to hold back 65% for the second dodge when only 50% of the print time remains.

If multiple dodges are to be made the shortest dodge must be made first.

1. <u>Set the base exposure</u> 2.0 but do not expose

2. <u>Press the menu key</u> to advance to dodging $d0.5$ and enter the number of stops to hold back.

3. <u>Insert the dodger.</u> If more than one dodge is to be made then all the dodgers must be inserted. When placing the dodgers it can be useful to use the footswitch to turn the enlarger on for focusing with either the paper covered or the red filter in place.

4. <u>Start the exposure</u> with the expose key or footswitch. If a footswitch is used then both hands are free to hold dodgers when the exposure is started.

5. <u>Remove the dodger(s).</u>

   If this is the last or only dodge then go to step 6.

   If more than one dodge is being made then remove the dodger for the just completed dodge, leaving the other dodgers in place. Enter the number of stops for the next dodge and go to step 4.

6. <u>Press the menu key</u> to advance to $Fin.$.

7. <u>Press the expose key</u> to make the finishing exposure. All the dodgers should be removed from the light path.

8. <u>Make burns</u>, if any. The timer will advance to burning $b0.5$ at the completion of the finishing exposure. If no burns are to be made then press the menu key to return to the base exposure display.

The timer's memory mode aids in making multiple dodges. Every tap of the footswitch starts a dodge exposure and then advances to the next dodge exposure automatically – leaving the hands entirely free to manipulate the dodgers.

<u>Burning</u>

Burning is performed after the base or dodge exposure has been made. Each burn is for a different area of the print. To give an additional burn exposure inside of a burn see Progressive Burning, below.

1. <u>Press the menu key</u> to advance to burning $b0.5$.

2. <u>Set the burn exposure</u> with the arrow keys $b0.6$, $b0.7$ ...

3. Insert the burning card.

4. Press the expose key.

5. If more than one burn is to be made then return to step 2 and enter the next burn exposure.

6. To burn within the just burned area go to the next section on progressive burning, below.

7. If all burning has been completed then press the mode key twice. You will go back to the base exposure display, passing the progressive burn display p0 . 5 on the way.

Progressive Burning

Progressive burning is used to make a burn inside of a previously burned in section.

1. Press the menu key after the base burn (above) has been completed and advance to the progressive burning display p0 . 5.

2. Set the progressive burn exposure with the arrow keys p0 . 6, p0 . 7 ...

3. Insert the burning card.

4. Press the expose key

5. To burn inside the just burned progressive burn return to step 2 and enter the next progressive burn exposure.

6. If all progressive burning has been completed and you want:

   To make another sequence of progressive burns inside this base burn, press the menu key to go to the reset display rΞ . n and press the up arrow so the display shows rΞ . y. This resets the progressive sequence. Then press the menu key again to return to progressive exposures p0 . 5 at step 2.

   To make another base burn, press the menu key several times until the burn b0 . 5 display appears.

   To make another print, press the menu key several times until the base exposure 2 . 0 display appears.

Test Strips

The timer can make test prints with any base and exposure increment. The timer can make either progressive test strips where a strip of the paper is covered with each exposure or it can make individual test prints in a series of increasing exposures. The choice of test strips/prints is made in setup mode; the timer ships with the factory default set to progressive test strips.

Progressive Test Strips

1. Underline Make a base exposure of the entire sheet as described above. This exposure should be below the expected exposure for the print so that one of the test strips will show both the proper exposure and the exposures above and below.

2. Press the menu key until the display shows test strip mode **t0.5** and set the desired step size with the up and down keys.

3. Cover a strip of the paper with a card and press the expose key. After the exposure the timer will flash the total exposure, in stops, of the just exposed strip.

4. Advance the card across the paper and press the expose key for the next exposure. Repeat across the sheet of paper.

+2 SKY

+1 CLOUD SHADOW

-1 TREE

+2 BEACH
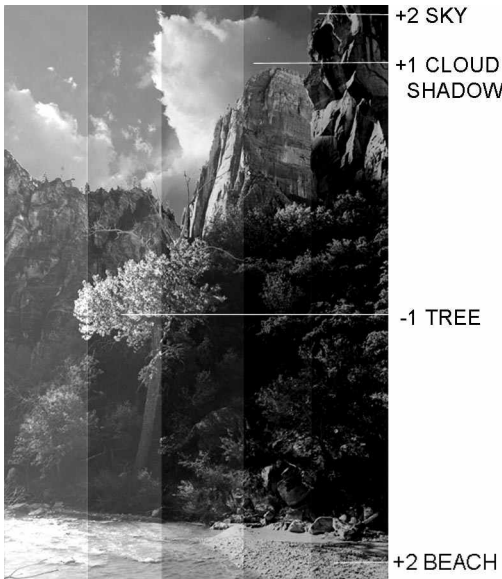
The result should look like the example test print at left.

The print was made at a base exposure of **1.0** and a test strip interval of **t1.0**. The middle strip, at 3.0 stops, is correctly exposed and chosen for the base exposure.

It also shows dodging and burning adjustments to the base exposure. Note the adjustments are in stops +/- from the central base exposure.

With each advance of the card across the paper, the timer exposes for the additional amount of time needed to expose the next strip along with remainder of the sheet. This might seem confusing at first – as an example:

Base exposure = 2.0; Test strip interval = t0.5

Strip	Stops	Timer exposure	Total time
Base / strip 1	2.0	4.00 seconds	4.00 seconds
Strip 2	2.5	1.66	5.66
Strip 3	3.0	2.34	8.00
Strip 4	3.5	3.31	11.31
Strip 5	4.0	4.69	16.00

Individual Test Prints

Make the first print at the base exposure. Advance to test strips t0.5, enter the stop difference between prints and make subsequent prints at equal stop intervals with each press of the expose key.

Making a Print, an Example

Using the test print above as an example the sequence of exposures is:

1. Make the base exposure and dodge the tree:

    a. Set the base exposure to 3.0;
    b. Press the mode key to the dodge display and set d1.0 stops;
    c. Insert the dodger over the tree foliage;
    d. Press the expose key;
    e. Remove the dodger and press the mode key to advance to Fin.
    f. Press the expose key and make the finishing exposure.

2. Burn in the beach:

    a. Press the mode key to advance to the burn display and set b2.0 stops;
    b. Insert a card to cover all but the beach;
    c. Press the expose key to make the burn exposure.

3. Burn in the sky and clouds:

    a. Set the timer to b1.0 for the sky & cloud burn;
    b. Cover all but the sky and clouds;
    c. Press the exposure key to make the burn exposure.

4. Burn in the upper sky for one more stop:

a. Press the mode key and use the up down keys to set the timer to a progressive burn of **p1.0** stops;
b. Cover the foreground, lower sky and clouds;
c. Press the exposure key to make the additional 1 stop burn for the upper sky.

Paper Speed Adjustment

The paper speed adjustment compensates for changes in paper sensitivity. Photographic paper loses speed as it gets older – often 0.3 stops between opening a new box and removing the last sheet. If you keep notes on exposures – or keep print exposures in memory – it may be easier to use standard exposures and enter the state of the paper's speed at the beginning of a printing session.

To use this feature, make a reference print on your present paper at reference conditions of enlarger height, lens opening and exposure. Either a step tablet or a uniform 18% grey work best for a reference print. Keep this print as your 0.0 stop adjustment reference. Check the paper every month or so by making a 0.1 stop test strip print around the reference exposure and see if the paper has lost or gained sensitivity by finding test strip that matches the reference print; Enter the exposure change required at the paper speed adjustment display **J.0**. Speed can be adjusted from –3.0 to +3.0 stops.

When an exposure is made the starting count-down time will reflect the change in paper speed.

Drydown

The drydown percentage must be entered before you start a print. Advance to drydown **% 0** with the menu key and enter the drydown percentage 0 to 30%. All printing times will be shortened by this percentage to compensate for print darkening – this will be reflected in the displayed starting time when an exposure is made.

Drydown compensation varies with the paper, paper contrast grade, evaluation lighting, toning, ferrotyping, drying temperature, mounting method, covering glass and display lighting. Tests should be run to determine the degree of drydown compensation required, if any.

MEMORIES

Introduction

Description

The timer's memory feature lets you program and play back the sequence of base, dodge and burn exposures you use to make a print.

The timer has 15 memory banks of 20 steps each. You can keep multiple prints/programs in a single memory bank.

When you use the memory, the timer displays the step number, the type of exposure and the exposure value. As each exposure is made the timer automatically advances to the next exposure. At the completion of all the steps the timer resets itself back to the first step.

The memory is nonvolatile. The timer will remember your programs with the power off for up to 100 years.

Uses

The memory feature is useful for:

- Making multiple prints from the same negative. The printing process goes faster: You don't have to cycle the timer through base/dodge/burn steps and for prints with multiple dodges and burns; You don't have to enter the values for each exposure and so the chances for error are minimized. Production printing becomes a process of waving your hands to dodge and burn and tapping your foot to move to the next step.

- Designing a print. Add and modify exposures one at a time as you settle on the dodges and burns needed to get to the print you want. The timer keeps accurate notes for you by remembering the exposures you used.

- Complex printing. Make sure all steps are included and made at the correct exposure by programming the timer before printing.

- Split-grade printing. The timer has special provisions for split grade printing. The high and low contrast filter exposures are maintained separately and can be set to track each other, thus allowing separate control of exposure and contrast. Each filter can have its own dodge and burn sequence and graded dodge and burn exposures can be programmed that track either the high or low contrast channel.

Basic Memory Operations

Entry and Exit

Make sure the memory feature is enabled. If the memory prompt does not show up then enter setup mode and turn on the memory feature.

Enter memory mode from basic mode by pressing the menu button until the display shows **m 1**. Select the number of the memory bank with the arrow keys and hold down the menu key. The display will show the current memory step – **1E2·** in the selected bank.

To exit memory mode hold down the menu key at a memory step display – **1E2·**, **3b·5** etc.. The timer will go back to the basic mode menu loop and the display will show **m 1**.

Memory Display and Data Entry

Memory steps are displayed as **1E2·:**

Step #	Step type	Exposure
1	E	2·

The step number goes from **1** to **K**. Step numbers greater than 9 are represented alphabetically: **A** for 10, **b** for 11, **C** for 12 ... to **K** for 20.

The step type is an alpha prompt – **E** for base exposure, **H** for high contrast, **L** for low contrast – as shown in the table below.

The step exposure is shown as the most significant digit of the exposure. Exposures less than one stop are shown as **·0** to **·9** and exposures greater or equal to one stop are shown as **1·** to **9·**. The full exposure value can be viewed and altered by pressing the menu key.

Empty, unprogrammed steps are displayed as **2‑‑**.

Step types

There are 14 step types. They are:

Display	Description
-	blank step
E	base **E**xposure
L	**L**ow contrast exposure of a split-grade pair
H	**H**igh contrast exposure of a split-grade pair
d	**d**odge exposure
b	**b**urn exposure
p	**p**rogressive burn exposure
rᴱ	**r**eset progressive start exposure to the base burn *
r=	**r**eset progressive start exposure to the last progressive waypoint *
S=	**S**et progressive start exposure waypoint *
AG.	Make the print **AG**ain *
F	**F**ilter change prompt
J	paper speed ad**J**ustment
%	**%** drydown compensation

* Only one character is shown when the type is set – this keeps the display for setting the exposure type from looking like the step display:

5 ᴱ	for **5 rᴱ**	reset progressive start to base exposure
5 =	for **5 r=**	reset progressive start to waypoint
5 S	for **5 S=**	set waypoint
5 A	for **5 AG.**	make the print again

Exposure value and type are set and viewed with the menu key:

Set the exposure value by pressing the menu key when a step is displayed – the display changes from `1E2.` to `E2.0`.

Step type   Exposure
`E`   `2.0`

Set the exposure in stops with the arrow keys. Return to the step display by pressing the menu key again.

Set the exposure type by holding the menu key down for one second when the value display `E2.0`, described above, is showing. The LED changes from `E2.0` to `1  E`.

Step #   Step type
`1`   `E`

Select the new type with the arrow keys. Press the menu key to return to the value display to enter the exposure for the new exposure.

Step 1 is always a base exposure: `E`, `H` or `L`.

Note: holding the menu key down when the step display `1E2.` is showing will exit memory mode.

Program a blank step `2--` by pressing the menu key. The timer will go immediately to setting the exposure type `2  -`. Select the exposure type `2  b` and press the menu key to go to the value display `b0.1` and set the exposure in stops `b1.4` with the arrow keys. Press the menu key one more time to return to the step display `2b1.`   Note how the value of `1.4` truncates to `1.`: only the display is truncated, the exposure remains as a 1.4 stop burn and the full value `b1.4` is shown by pressing the menu key.

Steps are inserted and deleted from the step display:

Insert, delete and clear by first going to an exposure type display. Starting at the step display `2b1.` tap the menu key and then hold it down for one second so the display shows the step type `2  b`, then:

Delete a step by pressing the up arrow until the display shows `dEL.`. Pressing the menu key will then delete the current step. All the following steps in the memory bank will fall down a notch and a blank step will be inserted at position 20 at the end of the bank. Step 1 can not be deleted and can only have it's type and value changed.

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Before deleting step 2:	After deleting step 2:

`1E2.`	`1E2.`
`2b1.` ⟶	`2b.5`
`3b.5`	`...`
`...` ⟶	`Jd1.`
`Kd1.`	`K--`

Insert a step by pressing the up arrow until the display shows `InS.`. Pressing the menu key will insert a new step after the current step and the display will show a blank step at the new location. The exposure at step 20 (shown as `K`) will fall off the top of the memory bank and be lost.

Before inserting at step 2:	After inserting at step 2:

`1E2.`	`1E2.`
`2b1.` ⟶	`2--`
`...` ⟶	`3b1.`
`JL2.`	`...`
`Kb.5` ⟶	`KL2.`
	⟶ (lost)

Erasing a Memory Bank

Erase a memory bank pressing the up arrow to go to step 20 `Kb.5`. Release the up arrow and then hold it down for one second so the display shows `Er.n` – 'Erase No'. Press the up arrow to change the display to `Er.Y` – 'Erase Yes' – and then press the menu key -- the memory bank will be erased and the display will show `1E2.`. To exit without erasing the bank press the down arrow so the display shows `Er.n` and press the menu key -- the display will go back to showing step 20 `Kb.5` and the contents of the memory bank will remain as they were.

<u>Single Grade Exposures with Memory</u>

A memorized single grade exposure sequence is made up of the following elements. They must be in the order shown:

- Base exposure – Required
- Adjustments for paper speed and drydown – Optional
- One or more dodge exposures – Optional
- One or more burn / progressive burn exposures – Optional
- An 'Again' step to return to the base exposure – Optional

For clarity the display/exposures are shown in the manual with the entire exposure setting. Normally a base exposure of 3.2 stops at step 5 would show on the display as **5E3.** -- however, in the instructions below it will be illustrated as a display of **5E3.2** and the truncation will be eliminated.

Base exposure

A memory bank can contain more than one print. Each print has it's own base exposure which can be located anywhere in the bank.

Step 1 of each memory bank is always a base exposure **1E3.1**. When a bank is erased the first step is set to **1E2.0** - a single contrast base exposure of 2.0 stops.

Adjustments

Adjustments, **2J0.3** (example: add 0.3 stops to the base exposure to compensate for age-related loss of paper speed) and **3%6.5** (example: decrease exposure by 6.5% to compensate for drydown darkening) are optional. When included they must follow the base exposure step.

If adjustments are enabled and specified in basic mode they will be applied to the memory exposure. If adjustments are specified in the memory sequence then they will over-ride any basic mode adjustments. Memory adjustments will be applied even if basic mode adjustments have been disabled in the timer's setup.

The timer will pick up and apply the adjustments when the base exposure is made. The adjustment steps will not be shown and the timer will advance to the step following the adjustments at the completion of the base exposure. If dodging the timer will skip over showing the adjustment steps and go straight to the first dodge.

Dodging

Dodging steps **2d1.3** are optional. Multiple dodges to the limit of memory are allowed, however they must be programmed with the shortest dodge first.

The timer advances to the first dodge step when the expose key is pressed to make the base exposure.

To dodge, insert all the dodger(s) and press the expose key. Then remove the dodger for the completed dodge - leaving the others in place - and press the expose key for the next dodge. Repeat to make the remaining dodge exposures. The timer will insert a **Fin.** step after the last dodge to make the undodged remnant of the base exposure.

Burning

Burn steps `4b1.0` are also optional, the number limited only by available memory. Burns can be made in any order. A set of progressive burns can follow each burn.

Filter Prompts

Filter prompts `3F2.5` are an aid when making burns with different contrast grade filters. You can insert them to remind you to change to a specific filter. They have no effect on exposure. When you are making a print the filter prompts don't display the step number, thus allowing the entire filter value to be displayed – `3F2.5` shows as `F2.5`.

Progressive Burning

Progressive burns within burns `5p0.6`, are optional and follow a simple 'base burn' `4b1.0` step. Each progressive burn builds on the exposure of the burns and progressive burns before it.

Each base burn can have one or more progressive burn sequences following it.

As an example

Step	Area	Total Stops of Exposure to area
`1E2.0`	Whole print	2.0 – whole print
`2b1.5`	Sky	3.5 – whole print + sky
`3p0.7`	Cloud in sky	4.2 – whole print + sky + cloud
`4p1.2`	Dark cloud lining	5.4 – whole print + sky + dark lining
`5b0.5`	Lake	2.5 – whole print + lake
`6p0.2`	Highlight in lake	2.7 – whole print + lake + highlight

Burning Waypoints

Burning waypoints memorize points in burning sequences. There is a fixed burning waypoint, accessed with `r⁼`, at the end of a base burn. The fixed waypoint is equivalent to setting `r⁼.Y` in manual mode to create a new progressive sequence from a base burn. The following example demonstrates burning in two clouds and their dark linings in a burned in sky:

Step	Area	Total Exposure to area
`1E2.0`	Whole print	2.0 = whole print
`2b1.5`	Sky	3.5 = print + sky burn
`3p0.7`	Cloud #1 in sky	4.2 = print + sky + cloud #1

4p1.2	Dark lining cloud #1	5.4 = print + sky + cloud #1 + dark lining
5r⬚	Reset to sky burn	(3.5 = print + sky)
6p1.0	Cloud #2 in sky	4.5 = print + sky + cloud #2
7p1.1	Dark lining cloud #2	5.6 = print + sky + cloud #2 + dark lining

Additional waypoints can be set in the middle of progressive sequences. This allows burning sequences that branch as well as nest. The following example shows where this feature is useful in burning in a sky and clouds where the clouds are in a portion of the sky that has received an additional burn:

Step	Area	Total Exposure to area
1E2.0	Whole print	2.0 = whole print
2b1.5	Sky	3.5 = print + sky
3p1.0	Upper sky	4.5 = print + sky + upper sky
S=	Set waypoint in upper sky	(4.5 = print + sky + upper sky)
4p1.2	Cloud #1 in upper sky	5.7 = print + sky + upper sky + cloud #1
5r=	Reset to waypoint	(4.5 = print + sky + upper sky)
6p0.6	Cloud #2 in upper sky	5.1 = print + sky + upper sky + cloud #2

Waypoints can be nested up to four levels deep. Unused waypoints **S=** are reset when a new base burn **7b1.3** is made.

Signaling the end of a print

The timer will automatically reset to the first print step when it senses the completion of a print – either because the next memory step is blank **8--** or the next memory step is a base exposure that begins another print **8E3.5**. To signal the completion of a print explicitly you can insert an **AG**ain step **8AG.** .

<u>Split Grade Printing</u>
The Basics

Split grade printing uses two exposures to control contrast when printing with variable contrast paper. One exposure is normally made with the #00 (Kodak #-1) low contrast filter and the other with the #5 (Kodak 5+) high contrast filter.

Each base exposure is followed by it's own sequence of dodges and burns. Dodge and burn exposures are relative to their own base exposure, **H** or **L**.

Contrast Control or Independent Exposures

The two base exposures for split grade printing are labeled **H** for high contrast and **L** for low contrast. The two can be in any order.

There are two options in how the **H** and **L** exposures relate to each other. The selection is made in the timer's setup mode and applies to all split grade printing. The selection can be changed at any time but the exposures stored in memory will have to be manually reprogrammed from the one scheme to the other:

- The two exposures can be <u>linked</u> so that the first controls the overall print exposure and the second controls the print contrast. Only the first base exposure needs to be changed when changing base exposure to compensate for changes in print size or other factors. The second base exposure is set in stops plus/minus the first base exposure and so the ratio of green to blue light, and hence the contrast, remains constant.

- The two exposures can be <u>independent</u> and both exposures affect print exposure and print contrast.   When the print exposure is adjusted both the high and low contrast base exposures will need to be changed. This independent mode has traditionally been used for split-grade printing where two test-strip prints are made to determine the **H** and **L** exposures: a high contrast filter test print for blacks/deep shadows and a low contrast test print made for the whites/highlights.

Tracking

Dodges and burns all track their respective base exposure, as they do for single-grade printing. Dodges and burns placed after the high contrast exposure track the high contrast base exposure and those placed after the low contrast exposure track the low contrast base exposure.

Because of this the contrast of the dodges and burns will track changes to the over-all contrast of the print.

SECONDS MODE

The timer has a simple seconds mode that is entered from setup mode.

To go from basic f-Stop mode to seconds mode:

- Hold the menu key down in basic mode to enter setup mode. The display will show **ti.F** for **ti**mer mode - **F**-Stop.
- Hit the down arrow to change to **ti.S** for **ti**mer mode - **S**econds.
- Hold the menu key down to enter seconds mode. The display will show **8.0** seconds.

To return to basic f-Stop mode:

- Hold the menu key down so the display shows **ti.S**.
- Hit the up arrow to change to **ti.F** for **ti**mer mode - **F**-stops.
- Hold the menu key down to enter basic f-Stop mode. The display will show **2.0** stops.

The timer remembers the current mode when it is powered off and will power up in the same mode.

Only two actions are possible in seconds mode:

- A timed exposure of 0.1 to 999.0 seconds
- Test strips/prints at equal time intervals

The expose key and footswitch work as before to start/pause/cancel and exposure and turn the enlarger on and off for focusing.

Time is set in 0.1 second increments from 0.1 to 20.0 seconds; in 1.0 second increments from 21.0 to 200.0 seconds; and in 10.0 second increments from 200.0 to 990 seconds.

The timer's ramp speed for setting seconds can be increased by tapping the opposing arrow key while the timer is ramping up or down.

Hitting the menu key advances to test strips **t1.0**. The timer either makes strips or a series of prints at equal time intervals as specified by setup mode's test strip type. The test strip interval can be set from 0.1 seconds to 99 seconds. The timer will flash the time of the last strip at the completion of each test exposure.

APPENDIX A: TIMER SETUP

Enter setup mode by holding the menu key down. Hold the menu key down in setup mode to return to timer mode. The timer may return to F-Stop or Seconds timing depending on the setting of the timer type **ti.F** or **ti.S**.

Pressing the menu key takes you from one setup item to the next.   The arrow keys choose between the setup options.

All settings are remembered with power off.

Timer type

ti.F   F-Stop timing
ti.S   Seconds timing

Lamp delay

Ld.y   Enable lamp delay
Ld.n   Disable lamp delay

If lamp delay is enabled the next menu item will set the delay time in seconds.

t.05   Sets the lamp delay from 0.00 to 0.99 seconds

When making a print the display will show **Ld-** during the delay time.

Test Strip type

tE.P   Progressive test strips
tE.i   Independent test prints

Split Grade printing

SG.i   Independent H and L channels
SG.L   Linked channels for exposure and contrast control

Memory enable

mE.y   Enable memory mode
mE.n   Disable memory mode - you may want to do this if you never use memory mode

Print adjustment enable

Ju.y   Enable paper speed adjustment

Ju.n   Disable adjustment - you may want to do this if you never use adjustment

Drydown compensation enable

%.d.y   Enable drydown compensation in percent

%.d.n   Disable drydown compensation - you may want to do this if you never use compensation

Focus timeout

tF.y   Enable focus time out

tF.n   Disable focus time out

If focus timeout is enabled the next menu item sets the time out in minutes

t 1.   Sets the timeout from 1 to 99 minutes

Software Version

V1.c   Shows the version of software loaded into the timer's microprocessor.

V.01   Minor revision

APPENDIX B: STOPS TO SECONDS

Stops	Seconds	Stops	Seconds	Stops	Seconds
-3.0	0.12	1.5	2.83	6.0	64.00
-2.9	0.13	1.6	3.03	6.1	68.59
-2.8	0.14	1.7	3.25	6.2	73.52
-2.7	0.15	1.8	3.48	6.3	78.79
-2.6	0.16	1.9	3.73	6.4	84.45
-2.5	0.18	2.0	4.00	6.5	90.51
-2.4	0.19	2.1	4.29	6.6	97.01
-2.3	0.20	2.2	4.59	6.7	103.97
-2.2	0.22	2.3	4.92	6.8	111.43
-2.1	0.23	2.4	5.28	6.9	119.43
-2.0	0.25	2.5	5.66	7.0	128.00
-1.9	0.27	2.6	6.06	7.1	137.19
-1.8	0.29	2.7	6.50	7.2	147.03
-1.7	0.31	2.8	6.96	7.3	157.59
-1.6	0.33	2.9	7.46	7.4	168.90
-1.5	0.35	3.0	8.00	7.5	181.02
-1.4	0.38	3.1	8.57	7.6	194.01
-1.3	0.41	3.2	9.19	7.7	207.94
-1.2	0.44	3.3	9.85	7.8	222.86
-1.1	0.47	3.4	10.56	7.9	238.86
-1.0	0.50	3.5	11.31	8.0	256.00
-0.9	0.54	3.6	12.13	8.1	274.37
-0.8	0.57	3.7	13.00	8.2	294.07
-0.7	0.62	3.8	13.93	8.3	315.17
-0.6	0.66	3.9	14.93	8.4	337.79
-0.5	0.71	4.0	16.00	8.5	362.04
-0.4	0.76	4.1	17.15	8.6	388.02
-0.3	0.81	4.2	18.38	8.7	415.87
-0.2	0.87	4.3	19.70	8.8	445.72
-0.1	0.93	4.4	21.11	8.9	477.71
0.0	1.00	4.5	22.63	9.0	512.00
0.1	1.07	4.6	24.25	9.1	548.75
0.2	1.15	4.7	25.99	9.2	588.13
0.3	1.23	4.8	27.86	9.3	630.35
0.4	1.32	4.9	29.86	9.4	675.59
0.5	1.41	5.0	32.00	9.5	724.08
0.6	1.52	5.1	34.30	9.6	776.05
0.7	1.62	5.2	36.76	9.7	831.75
0.8	1.74	5.3	39.40	9.8	891.44
0.9	1.87	5.4	42.22	9.9	955.43
1.0	2.00	5.5	45.25		
1.1	2.14	5.6	48.50		
1.2	2.30	5.7	51.98		
1.3	2.46	5.8	55.72		
1.4	2.64	5.9	59.71		