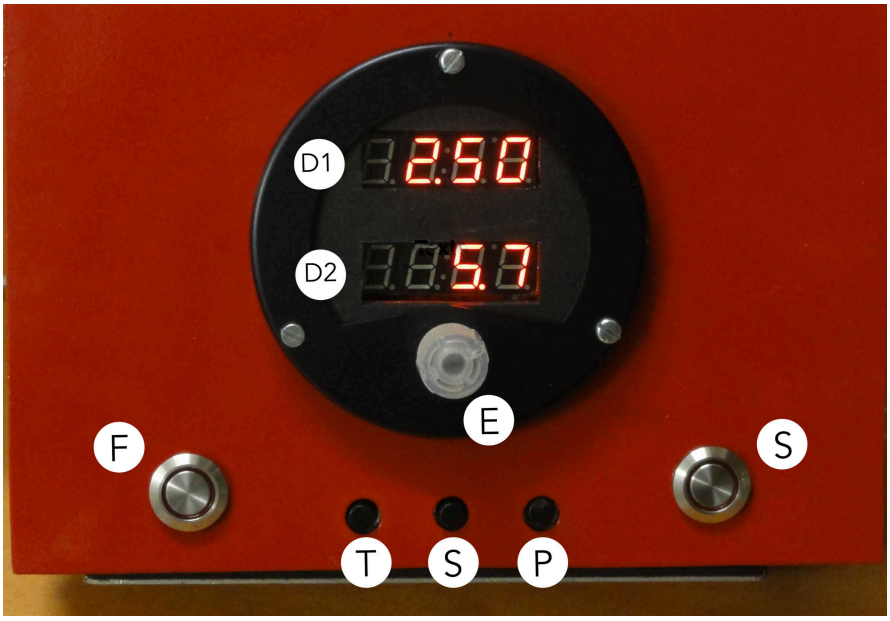
Monkito User's manual



Introduction

Monkito is a programmable darkroom timer intended to control your enlarger light. Exposure duration is displayed **both** in f-stops and seconds. Tests strips are automated and dodging/burning sequences can be programmed. A scaling correction function is available.

It is compatible for incandescent bulb type heads, and two channels green/blue variable contrast LED heads.

Description

Front panel

- E - Rotary encoder
- F - Focus light
- S - Countdown start/stop/resume/abort
- T - Timer functions
- S - Test strips functions
- P - Programs functions
- D1 - F-stops display
- D2 - Time display

Back panel

- 9 - Main switch
- 10 - Main inlet (fused)
- 11 - Enlarger 1 outlet
- 12 - Enlarger 2 outlet
- 13 - Enlarger selector toggle switch
- 14 - USB plug

Software :

version : 2.2

Hardware specifications :
Voltage : 240V - 50Hz, earthed
Main fuse : 2A
Outputs : 2 selectable earthed outlets
Max output power : 500W
Arduino board : Mega2560, rev3 clone
Low tension voltage : 10.9V
Arduino pins (14 total + SCL-SDA):
- Displays : SCL-SDA
- Buttons & encoder : 7 pins
- Device leds : 3 pins
- Piezo-speaker : 1 pin
- Enlarger relay : 1 pin
- LED enlarger head (optional) : 2 pins

Software specifications :
Size : approx. 23Ko on Flash memory
SRAM used : approx. 1.8Ko
Display method : I2C
Stops range : 0.00 – 10.00 in 1/100th
Time range : 1.0 sec – 1024 sec in 1/10th
Lighting delay range : 0.00 – 2.0 sec in 1/10th
Timing deviation : < 1 millisec, autocorrecting
Test strips range: 5 strips of 11 zones
Programs range: 5 programs of 11 steps

Version 2.2 modifications:

- Displays refresh method completely revised
- Timing method based on millis count vs delay for better precision and software stability
- Autocorrection of timing deviation
- Simplified program data entry method (automatic sequencing, no more need to select step)
- Lighting delay setting for preheating lighting devices
- Contrast control method based on split timing of two constant luminance channels
- Revised buttons functions
- All set-up values stored in non-volatile memory

Buttons functions

		F	1	2	3	E
action	**click**	**Focus**	**Timer**	**Test strips**	**Programs**	**VC Head**
selection	short	-	f-stop / time	strip ID	program ID	contrast grade
selection	double	-	strip zone	strip interval	program step	-
set-up	hold	brightness	f-stop increment	exposure mode	step entry mode	-
set-up	long hold	-	-	-	-	lighting delay

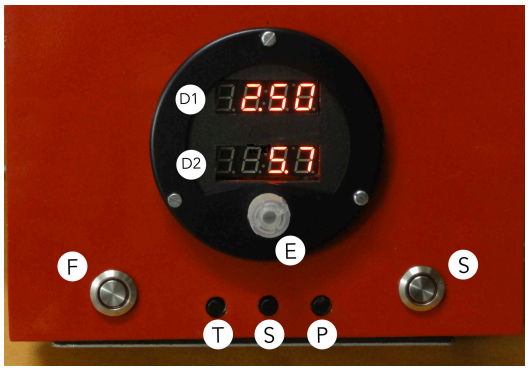
The F-Stop / time Selector function is the starting point for all modes.
It is enabled by default

Buttons combinations

Functions / Buttons	1 Timer	2 Test strips	3 Programs
Scaling correction ON	**Short click & Short click**		
Scaling correction OFF	**Short click**		**Short click**
Program CLEAR		**Short click & Short click**	

Buttons and displays:

E : rotary encoder
F : Focus light on/off
S : Start / Stop / Resume / Abort
1 : timer mode
2 : test-strip mode
3 : program mode
D1 : Display 1, f-stop
D2 : Display 2, time



Initial set-up

The following values may be changed at any time without restart.
These values are stored in non-volatile memory and are not lost when switching the device off.

1. Displays brightness :
   1.1. Hold click (F)
   1.2. Rotate encoder (Values 1 – 8)
   1.3. Single click (F)

2. F-stop selector increment step
   2.1. Hold click (T)
   2.2. Rotate encoder (values in f-stop : 0.01, 0.10, 0.20, 0.25, 0.33, 0.50, 1.00)
   2.3. Single click any of (T) (S) or (P)

3. Strips and programs Exposure mode
   3.1. Hold click (S)
   3.2. Rotate encoder (Cover, Uncover, Single modes)
   3.3. Single click any of (T) (S) or (P)

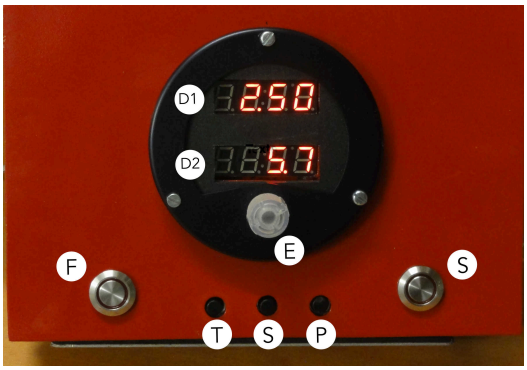
Note : As all strips and programs values are calculated and stored in the 3 modes,
strips and programs may be run in any mode at any time.

4. Program steps entry method (for dodging / burning sequences)
   4.1. Hold click (P)
   4.2. Rotate encoder (« Full » or « diff » modes)
   4.3. Single click any of (T) (S) or (P)

See page chapter 3 « Program mode » for full explanation

5. Lighting delay (for pre-heating lighting heads)
   5.1. Hold click (E)
   5.2. Rotate encoder (values in seconds 0.0 – 2.0)
   5.3. Single click any of (T) (S) or (P)

When a delay is set, an apostrophe appears on display D1 and all exposures are increased by this value.
To reset to zero, simply select a 0.0 delay.



D1 = f-stop value (1/100 resolution)
D2 = time in seconds (1/10 resolution)

1. Timer mode - Single click on button (T)

1. Set a f-stop / time
   a. Rotate encoder knob (E)

2. Expose
   a. Short click Start button (S)

3. Start / stop / resume
   a. Short click Start button (S)

4. Abort
   a. Hold click Start button (S)

To switch the focus light ON / OFF, short click (F)

2. Test-strip mode - Single click on button (S)

Timing table of an automated test strip
Timer counting sequences in **Bold**

zone	1		2		3		4		5		6		7		8		9		10		11
zone f-stop	2		2 ¼		2 ½		2 ¾		3		3 ¼		3 ½		3 ¾		4		4 ¼		4 ½
zone time	4		4.8		5.7		6.7		8		9.5		11.3		13.5		16		19		22.6
exposure (sec)	**4.0**		**0.8**		**0.9**		**1.0**		**1.3**		**1.5**		**1.8**		**2.2**		**2.5**		**3.0**		**3.6**
pause (sec.)		**1**		**1**		**1**		**1**		**1**		**1**		**1**		**1**		**1**		**1**	

set-up : covering mode - start f-stop : 2 - step size: ¼ f-stop

1. Set and expose a test strip
   a. Short click (T) to set the base time
   b. Short click (S) to set the strip number
   c. Double click (S) to set the interval
   d. Expose (the sequence runs automatically with a 1 sec. pause between zones)

2. Expose a single zone from a previous test strip
   1. Double click (T)
   2. Rotate encoder (values from Strip 1 – zone 1 to strip 5 – zone 11)
   3. Expose

3. Clear a test strip
   4. Simply overwrite the strip with new settings

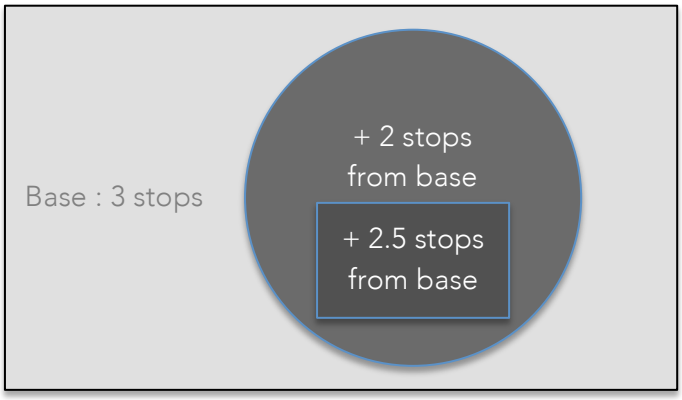
3. Program mode - Single click on button (P)

This mode is intended to program a sequence of exposures, for example for dodging/burning. All programs can be run in any exposure mode, i.e. cover, uncover, single.

The durations settings must be set in increasing order, i.e. shorter first, longer last.

Two input modes are available :

Full mode :
Step 1 : 3.00
Step 2 : 5.00
Step 3 : 5.50



Diff mode :
Step 1 : 3.00
Step 2 : 2.00
Step 3 : 2.50

1. Set a program
    a. Short click (P), select the program number
    b. Short click (T) to select the base f-stop/time
    c. Double click (P), f-stop is stored, now ready for the next step
    d. For the next steps, start over from **step b**.

2. Run a program
    a. Short click (P), select the program
    b. Short click (S) to expose, step by step

3. Abort a program run
    a. Hold click (S)

4. Clear a program
    a. Short click (P), select the program
    b. Short click (S) & (P) together

4. Scaling correction

1. **Set a scaling correction**
    a. Short click (T), set the scaled length relative to unscaled 10cm
    b. Short click (T) & (S) together

When a scaling correction is applied, an apostrophe appears on time display.
All times are corrected accordingly

2. **Reset a scaling correction**
    a. Hold click (T) & (P) togheter, scaling off message, apostrophe off

5. LED enlarger head mode

This mode allows a variable contrast grade selection by splitting the total exposure time in two consecutive partial times for blue and green LEDs. 25 Steps of ¼ of a grade are available, ranging from 00 up to 5.

The **upper display** shows the relative ratio between the blue (left) and green (right). The ratio is expressed in steps, ranging from 00 (no signal) up to 24 (maximum signal). For example,
grade 00 is displayed as 00:24 (no blue : maximum green),
grade 2 => 12 :12

The **lower display** shows the selected grade. Grades below 1.00 are displayed according to the following chart :

Grade	Upper display	Lower display
00	00 :24	00: -
00 1/4	1 :23	00:25
00 1/2	2 :22	00:50
00 3/4	3 :21	00:75
0	4 :20	0: -
0 1/4	5 :19	0:25
0 1/2	6 :18	0:50
0 3/4	7 :17	0:75

Functions

1. Select a grade
    a. Short click (E), the encoder knob red led is ON
    b. Rotate the encoder knob (E) or use one of the following shortcuts
    c. Short click (F), encoder knob led is OFF

Shortcuts to preset grades (see above 1.b.)

- short click (T): grade 00
- short click (S): grade 2
- short click (P): grade 5