

# TM

## TIME MACHINES

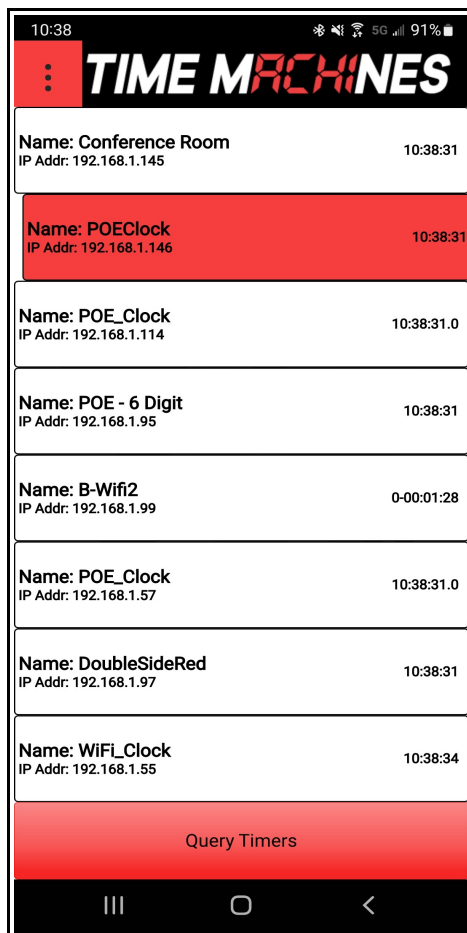
### TM-Timer Smartphone App

*\* Operation Manual \* Version 2.2 \**

*RGB Support*

*Supported in 'B' hardware, firmware versions 4.8 POE, and 2.5 WiFi*

*Supported in 'C' hardware, firmware versions 5.2 POE, and 3.2 WiFi*



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## 1 Introduction

TM-Timer is a Smartphone App that is available for both Apple IOS and Android based devices. It allows control of the timer functions of the TimeMachines Displays: POE, WiFi, and DotMatrix. Functions controlled include basic stop-watch count-up functions, simple count-down controls, as well as advanced timer “programs” that include support for interval/round functions and advanced sequences for count-up and count-down timers with repeat looping control such as Tabata timers. Programs can be saved to the non-volatile memory of the displays and set to execute at specific times of the day. Communication with the clock displays is done through UDP/IP messages so the smartphone running TM-Timer must be on a WiFi network with connectivity to the displays.

## 2 Installation

The TM-Timer application can be installed on most devices from the Apple App Store, or the Google Play Store by searching for “TimeMachines TM-Timer”. TM-Timer features are fully implemented in version 4.6 and greater of the POE clocks, 2.4 of the WiFi Clocks, and 2.2 of the DotMatrix displays.

## 3 Home Screen

The home screen, shown to the right, is used to select the devices that will be used for any timing operation. The Query button at the bottom of the screen will send a broadcast message out that the displays listen for and respond to. This response is how the app displays the list of available devices for timing operations. The Query button is automatically clicked when the app initially starts up, but can be clicked again to resend the broadcast discovery message.

The devices that subsequent timing operations will be sent to are selected by clicking on them. Selected clocks will have a red background as shown in the picture to the right. UDP/IP messages are sent to and from ONLY the devices that are selected in this screen. If no devices are selected, timer display will only be on the local screen. If there are more than 8 displays on the local network, the list can be scrolled up and down by dragging a finger on the displayed list.

TM-Timer will periodically update itself to display on the right side, the currently displayed time or timer function of the clock. The more frequently this is updated, the more accurate it will remain. It is not a perfect representation since the time displayed is a snapshot from the clock and then updated locally on the app.

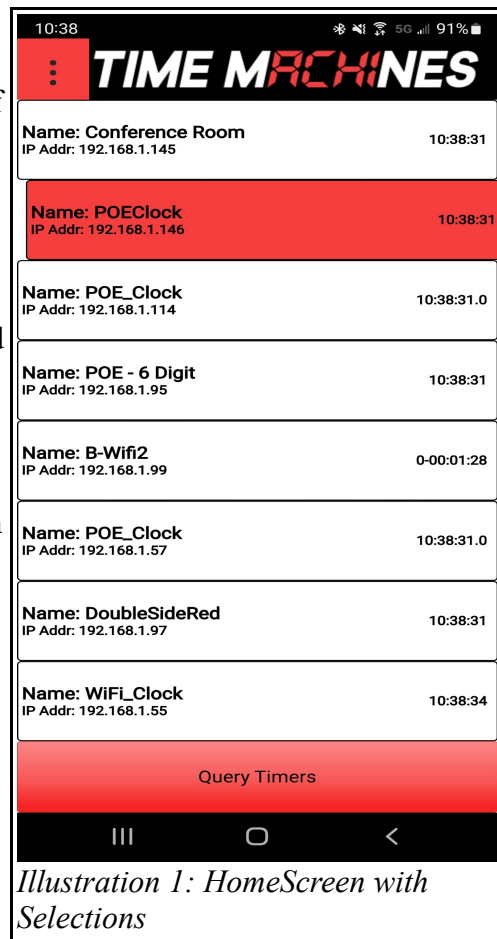


Illustration 1: HomeScreen with Selections

## 4 Application Menu

The menu for the application is accessed by clicking on the menu button in the top left corner of the Home Screen. It will look like the image displayed to the right. This menu has a number of options for the application. The options are fairly self explanatory, but are covered here individually as well as functionally in subsequent sections. The menu can also be drug back in to the left side of the screen, or the main screen can be clicked and the menu will slide back to the left.

### 4.1 Setup Parameters

Selecting Setup Parameters will display the dialog box to the right. The individual setup items are as follows:

#### 4.1.1 Broadcast IP

The Broadcast IP setting is one of the more often adjusted settings, particularly when the app is first used. By default it will be 255.255.255.255 which should work in most cases. Sometimes it will be necessary to use something more specific to the IP subnet the clocks are operating on. If the clocks are operating on a subnet with IP addresses in the range of 192.168.1.X, then using a broadcast IP address of 192.168.1.255 may be useful to get them to respond. Remember that the IP address of any TimeMachines display can be found by double clicking the button on the device and watching the IP address scroll as four numbers separated by dashes.

#### 4.1.2 UDP Retries

All messages between the App and the displays is done through UDP/IP messages. UDP is a simpler protocol than TCP and data is not automatically acknowledged, however a simple Ack of commands received by the clocks is implemented. UDP retries is how many times a command will be sent without receiving an acknowledgment. Three is generally a good number for this setting.

#### 4.1.3 Retry Delay (ms)

The Retry Delay works with the UDP Retries setting and is the amount of time the app will wait for an acknowledgment to be received before it will resend a command on the network. WiFi networks tend to be slower and generally work best with 200-450ms delay, slightly faster responses are possible with wired networks, but the need for retries, and shorter delays, is generally reduced in displays that are connected with wired cat 5 cables.

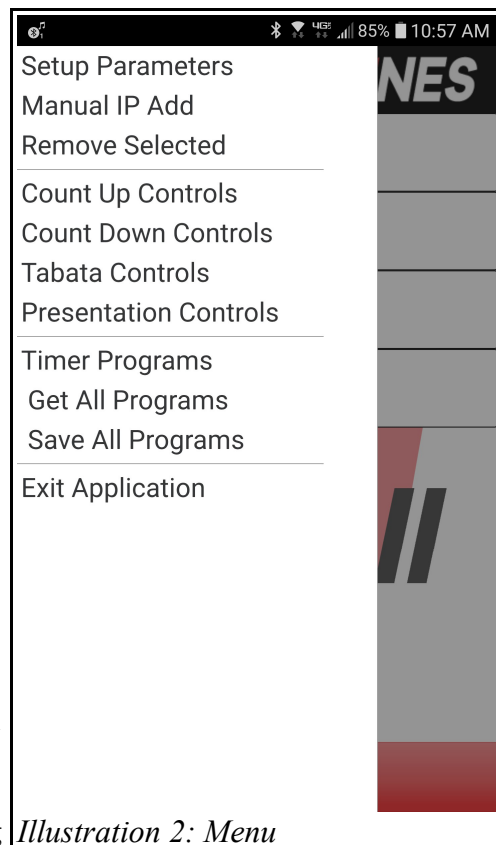


Illustration 2: Menu

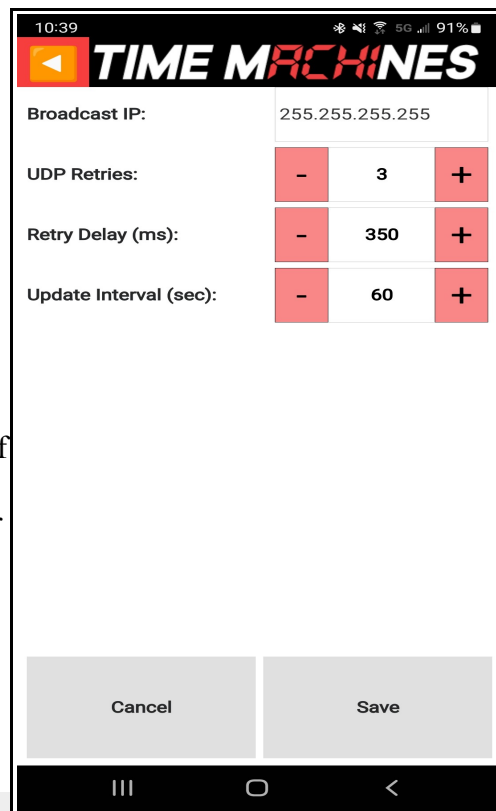


Illustration 3: Setup Dialog

#### 4.1.4 Update Interval

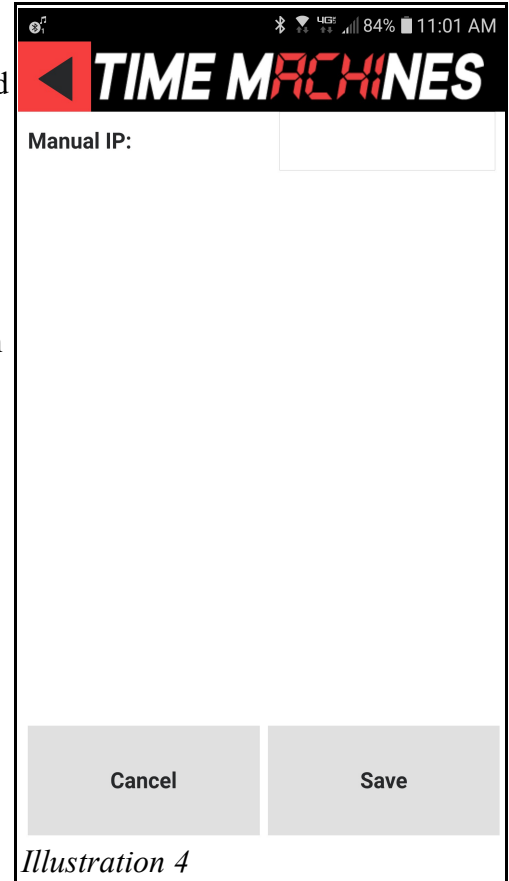
The Update Interval setting controls the frequency of the requests from TM-Timer to each clock to try and display the clocks currently displayed time on the homescreen of the TM-Timer app. Default is to check every 60 seconds. This can be adjusted up and down as desired.

#### 4.2 Manual IP Add

Normal operation of the TM-Timer app, assumes that the WiFi connected phone running TM-Timer will be on the same network as the clocks that are being controlled. That may not always be the case, so the option to save an IP address was added in version 2.0 of TM-Timer. All communication with a display is done via routed UDP/IP messages and once the IP address is known, controlling devices that are on other subnets is possible. The TM-Timer app also stores the list of found devices so that manual entry of clock IP addresses will not be required in subsequent executions of TM-Timer. The Manual IP Add screen is shown at the right. The Remove Selected option can be used to remove devices that are no longer on the network at the same IP address. If the name of the display is not displayed in the main screen, then communication with the device is likely not occurring.

#### 4.3 Remove Selected

This option, when chosen will remove any selected displays from the main screen list. This is useful when displays whose IP address has changed remain in the list. See the Manual IP Add option for more information on this feature.



*Illustration 4*

## 4.4 Count-Up Controls

The count-up Screen is displayed to the right. All displays that were selected are simultaneously controlled from this screen. Count-up works pretty much the same as a stopwatch. The time displayed at the top of the app will be pretty close to the value displayed on the clocks at any given time with minor differences caused by network delays. If the selected display is already running a count up, then the app will read the approximate current value and reflect that status on the app. This enables starting one display, backing out to the main menu, and starting a separate count up on a second display, then jumping back and forth with TM-Timer showing the current value of each as it is rejoined. Specific buttons are discussed next.

### 4.4.1 Start/Pause

The Start Button, which will switch to Pause when the timer is running, is used to start the count-up process. Clicking it while the count-up is running will pause the count-up.

### 4.4.2 Reset

The Reset button is used to zero the displays. It also sends the display format information contained in the next section.

### 4.4.3 Display Format

The display format can be changed between one of two modes: MIN:SEC:Tenths of Seconds and Hour:Minute:Seconds. Click the button and select as needed. The display at the top of the screen will reflect this setting. When this is changed, it is a requirement to click the Reset button to send the setting to the selected displays.

### 4.4.4 Set CountUp Mode

This button is clicked to put the clocks into the count up mode. This must be done before the clocks can start a count up function. Previous versions of TM-Timer would automatically set this mode which occasionally disrupted the function of a display already running a count up timer. This also enables separate control of rejoin of displays that are running separate count up operations.

### 4.4.5 Set Time Mode

This button will put the selected displays back in normal time display mode as setup from the device webpage. If count-up mode is desired again, the count-up page will have to be exited and re-entered to start count-up mode again. The displays are setup to revert to time mode after 30 minutes of no timer function being used.

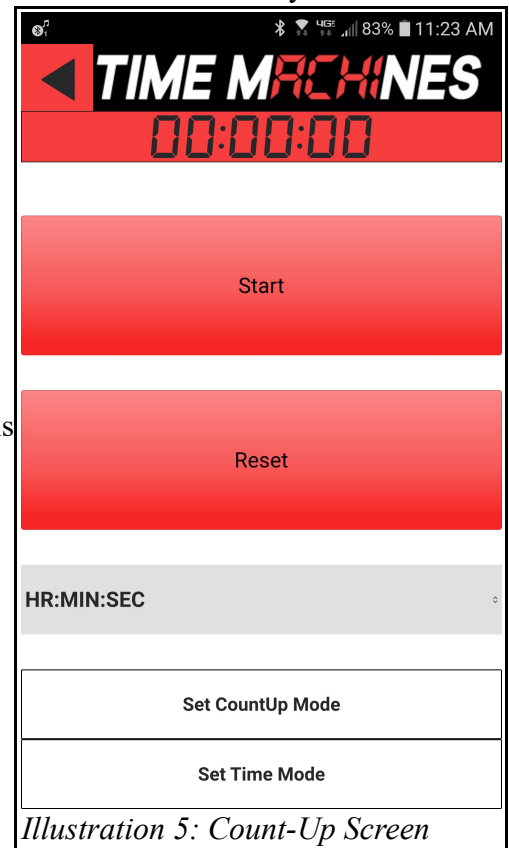


Illustration 5: Count-Up Screen

## 4.5 Count-Down Controls

The Count-Down Screen is displayed to the right. All displays that were selected when this screen is entered, will automatically enter the Count-Down mode on the display. The time displayed at the top of the app will be pretty close to the value displayed on the clocks at any given time with minor differences caused by network delays. If the selected display is already running a count down, then the app will read the approximate current value and reflect that status on the app. This enables starting one display, backing out to the main menu, and starting a separate count down on a second display, then jumping back and forth with TM-Timer showing the current value of each as it is rejoined. Specific buttons are discussed next.

### 4.5.1 Start Button

The Start Button, which will switch to Pause when the timer is running, is used to start the count-down process. Clicking it while the count-down is running will pause the count-up.

### 4.5.2 8 Preset Buttons

A count-down function has to start at some value. The 8 preset buttons allow the user to set up to 8 initial values that can be setup for count-down by clicking a single button. Each of these 8 buttons can be programmed as desired. A long press on the button will bring up the setup screen for the individual button shown on the right.

The name of the button is set at the top of the dialog. The next section sets the initial time for the count-down to begin from. The relay can also be optionally closed for a programmable duration at the end of the count-down. The display mode can be set between Minutes:Seconds:Tenths of Seconds and Hours:Minutes:Seconds. Enter the count-down parameters and click the Save button to save them to the button. To start a count-down with the parameters stored in the button, just click the button and the displays will jump to the time that was setup in the button. The Start button starts the count-down.

### 4.5.3 Set Countdown Mode

This button is clicked to put the clocks into the count down mode. This must be done before the clocks can start a count down function. Previous versions of TM-Timer would automatically set this mode which occasionally disrupted the function of a display already running a count down. This also enables separate control of rejoin of displays that are running separate count down operations.

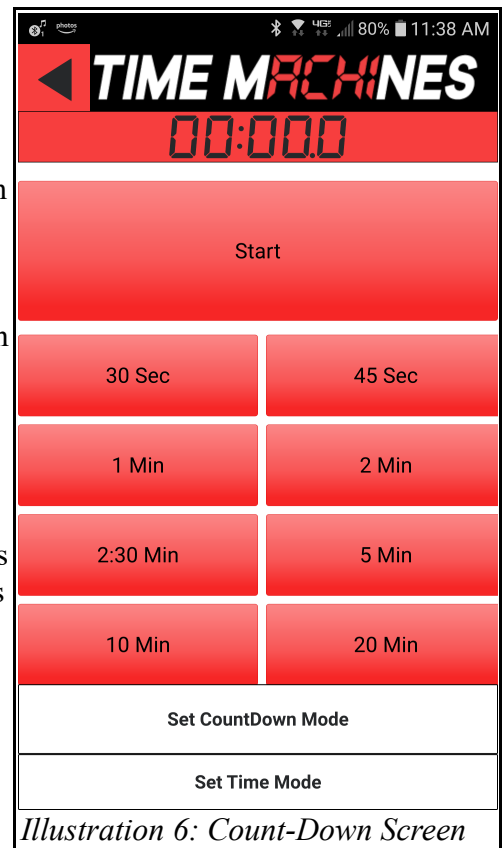


Illustration 6: Count-Down Screen

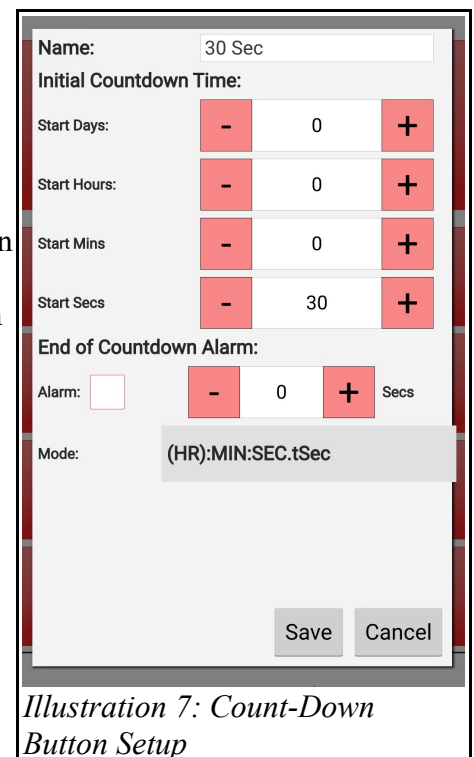


Illustration 7: Count-Down Button Setup



#### 4.5.4 Set Time Mode

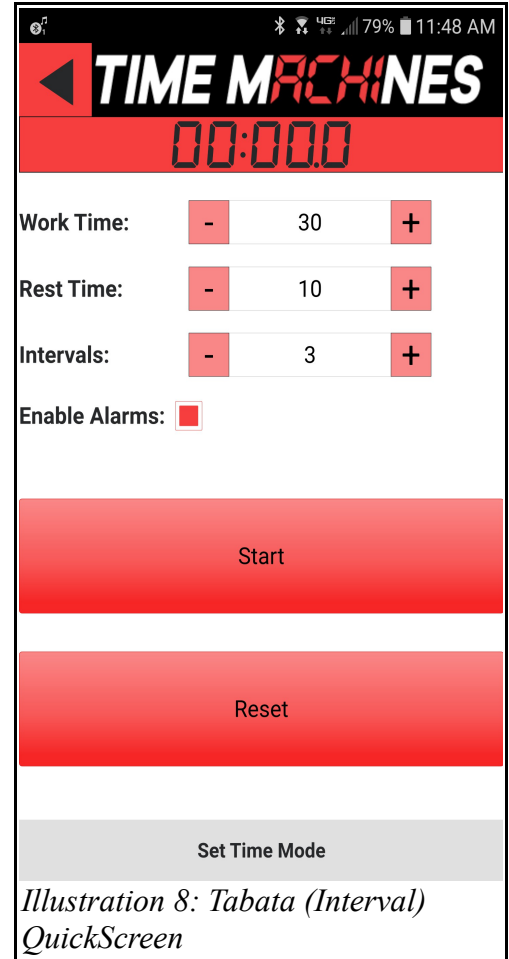
This button will put the selected displays back in normal time display mode as setup from the device webpage. If count-down mode is desired again, the count-down page will have to be exited and re-entered to start count-down mode again. The displays are setup to revert to time mode after 30 minutes of no timer function being used.

#### 4.6 Tabata Timer Screen (Interval Training Timer)

Tabata, or Interval Training, is a special timing mode where a number of rounds, or intervals, are set for the workout. A working period where maximum exertion is expended, followed by a rest period are completed in sequence a number of times. Alarms can also be included to signal a change in the workout mode. The Tabata time screen is a quick way to setup and run this type of sequence on one or more TimeMachines displays simultaneously. On RGB equipped displays, the round number will appear in blue with the workout time in green and the rest time in red.

Once the settings are chosen, the Reset button is clicked to send the program to the clock. Clicking the Start button will begin the count down. The count down can be paused by clicking the Start button again and the Reset button resets the program back to its initial values and updates any changes made in the dialog.

This screen actually creates a timer program and puts it in 10<sup>th</sup> program location of the displays. The resulting timer program can be viewed in the Timer Program section by getting the current program. It will be named to match the timings chosen in this dialog. Special versions of the program can be created with a Timer Program. When the program completes, the clock will revert to time.



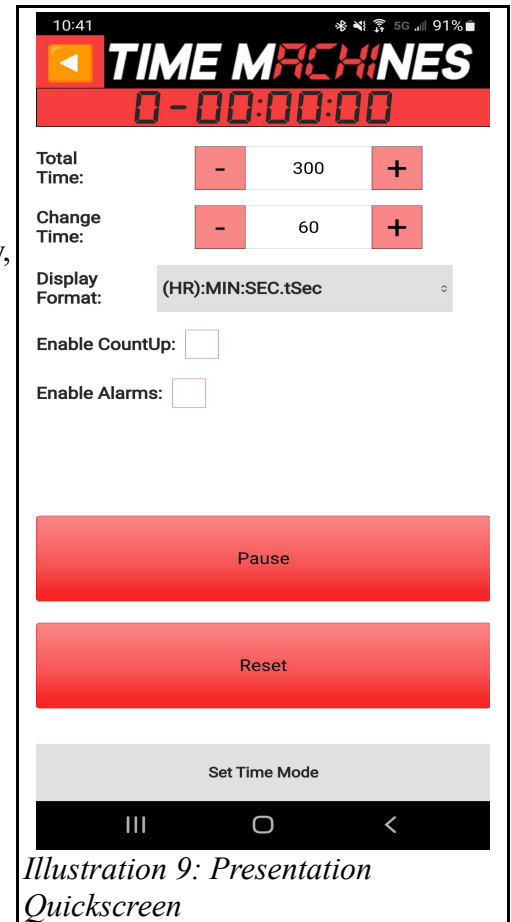
*Illustration 8: Tabata (Interval) QuickScreen*



## 4.7 Presentation Timer Screen

The Presentation Controls option opens the dialog to the right. It is intended as a shortcut way to run a standard color changing presentation timer on RGB displays. An example usage is that a presenter is given a certain amount of time to give their talk. That is the Total Time setting, displayed in green. At some later time, the color of the display goes to yellow to give the presenter a visual indication that their time is nearing its end. The change in color is set with the Change Time setting. Finally, if desired a count up timer can be started, default color red, when the count down ends to keep track of the speaker's time over their allotted limit. The internal relay can also be triggered when the count down reaches zero for a programmable length of time.

Once the settings for time, color, relay, and count up are made, the Reset button is clicked to send the program to the clock. The program, similar to the Pres:300-60 example in the Timer Programs will be stored to the 9<sup>th</sup> location in the clocks timer program memory. Clicking the Start button will begin the count down. The count down can be paused by clicking the Start button again and the Reset button resets the program back to its initial values and updates any changes made in the dialog. The resulting timer program can be viewed in the Timer Program dialog by getting the current program. It will be named to match the timings chosen in this dialog.



*Illustration 9: Presentation Quickscreen*

## 4.8 Timer Programs

Timer Programs represent a unique and powerful capability of the TimeMachines networked displays. With an essentially infinite number of options for setting up timing sequences, nearly any timing need can be met. Round/Interval timing is now supported for athletic training purposes, and support for sequential count-down timers or count-up timers is now possible. Looping constructs are also available to repeat sections of timing programs. Relay closure control for buzzers is also possible within the programs. With the release of the RGB displays, programs can also change colors as desired. The various aspects and options for creating timer programs and how they interact with the TimeMachines networked displays follows.

### 4.8.1 Start/Pause Button

The Start/Pause Button starts the Timer Program running on the App screen as well as any selected network displays. The time display at the top of page will show approximately what is on the clock displays, and the currently executing step will be highlighted.

### 4.8.2 Reset Button

The Reset Button sends the entire currently displayed program to the network display and puts the display into the Timer Program execution mode. Clicking the Start button starts the program execution. The program that is sent by the Reset button, does not save the program in the clock to anything other than the RAM of the clock and the program will disappear from that memory if the clock is restarted.

### 4.8.3 Set Time Mode

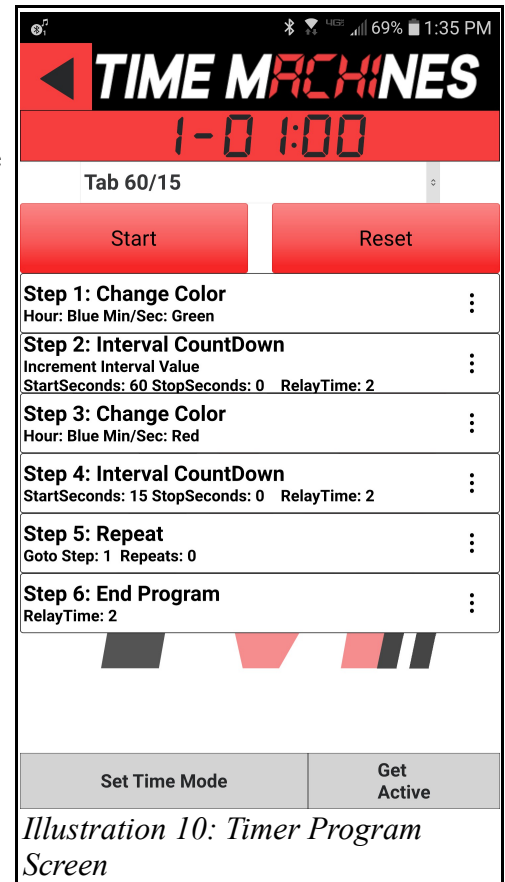
This button will put the selected displays back in normal time display mode as setup from the device webpage. The Timer Program mode can be re-entered by pressing the Reset button which will send the program to the displays again. The displays are setup to revert to time mode after 30 minutes of no timer function being used.

### 4.8.4 Get Active Button

The Get Active Button is used to retrieve the current program, in the first selected display, to the smartphone TM-Timer app. It will also grab the name assigned the currently active program and jump to that location in the TM-Timer program list. Once grabbed, the program is stored locally on the smartphone.

### 4.8.5 Starting a New Program

There are 10 available programs that are stored within the TM-Timer App. By default they are called Tab 30/10, Pres:600-60, Program 3 through Program 10 and can be changed by activating the pulldown below the time display and above the Start and Reset buttons. Clicking on the Program name allows the program name to be changed with the smartphone keyboard. By default, each program (3-10) has one default step, End Program. All programs must have an end program step as the final step. Protections exist in the App to ensure this.



*Illustration 10: Timer Program Screen*

Each Step in a program is numbered 1 through 10. Information about the function and settings of each step is displayed on the main screen for the program. Each program step has a popup menu associated with it. The menu contains the following entries:

**Edit** – The Edit option opens a dialog that allows the specific settings of the program step to be changed between functions. The specific options in the Edit dialog box will be discussed later in the document.

**Insert** – The insert option will add another program step before the step where the Insert option is selected. The inserted step will default to an End Program step that can then be edited for another function.

**Delete** – The Delete option will delete the step from which the Delete option is selected.

**Cancel** – The Cancel option simply exists the menu.

**Any change to any step of any given program is automatically stored within the App on the specific Smartphone it was edited on.**

### ***4.9 Save All / Get All Programs from Clock***

These menu choices are used to Get and Save all 10 local programs to one or more clocks. The Get All program retrieves all 10 programs from the first selected clock in the main window list. The Store button will send all 10 programs to all selected clocks, and tell the clock to save those programs to non-volatile flash memory.

### 4.9.1 Edit Timer Program Steps

When the Edit option is selected from a step's right edge menu icon, the dialog to the right opens up. Numerous options are available within a program step and not all of them will be available for a given program element type. Each of these element types will be discussed with the associated options.

**Interval Countdown** – Interval Countdown uses a format of the type “ROUND – MM:SS”. The option to increment the round number exists in these steps. If checked, then the round number will increment at the beginning of this step. The other features that are enabled for this option are the starting and ending time for the count-down, set with the Hours, Minutes, and Seconds settings. Additionally, the alarm relay can be actuated at the beginning of the step which would serve as essentially a “go” bell. Putting an Alarm at the beginning of the next program step can serve as an “end” bell.

**Interval CountUp** – Interval CountUp uses a format of the type “ROUND – MM:SS”. The option to increment the round number exists in these steps. If checked, then the round number will increment at the beginning of this step. The other features that are enabled for this option are the starting and ending time of the count-up. If set, the timer will count-up for the number of seconds specified by Hours, Minutes, and Seconds and then terminate the count-up and proceed to the next step. A setting for Hours, Minutes, and Seconds of zero will cause the count-up to continue forever essentially making it the last step of the program. Additionally, the alarm relay can be actuated at the beginning of the step which would serve as essentially a “go” bell. Putting an Alarm at the beginning of the next program step can serve as an “end” bell.

**CountUp HH:MM:SS and MM:SS:TS** – These two count-up options are the same except for the format of the number displayed during the count-up function. There is no round number displayed in this format. The other features that are enabled for this option are the starting and ending time of the count-up. If set, the timer will count-up for the number of seconds specified by Hours, Minutes, and Seconds and then terminate the count-up and proceed to the next step. A setting for Hours, Minutes, and Seconds of zero will cause the count-up to continue forever essentially making it the last step of the program. Additionally, the alarm relay can be actuated at the beginning of the step. Putting an Alarm at the beginning of the next program step can serve as an “end” bell.

**CountDown HH:MM:SS and MM:SS:TS** – These two count-down modes are identical except for the format of the numbers displayed during the count-down function. There is no round number displayed in this format. The other features that are enabled for this option are the starting and ending time for the count-down, set with the Hours, Minutes, and Seconds settings. Additionally, the alarm relay can be actuated at the beginning of the step which would serve as essentially a “go” or “end” bell depending on its position in the program. Putting an Alarm at the beginning of the next program step can serve as needed as well.

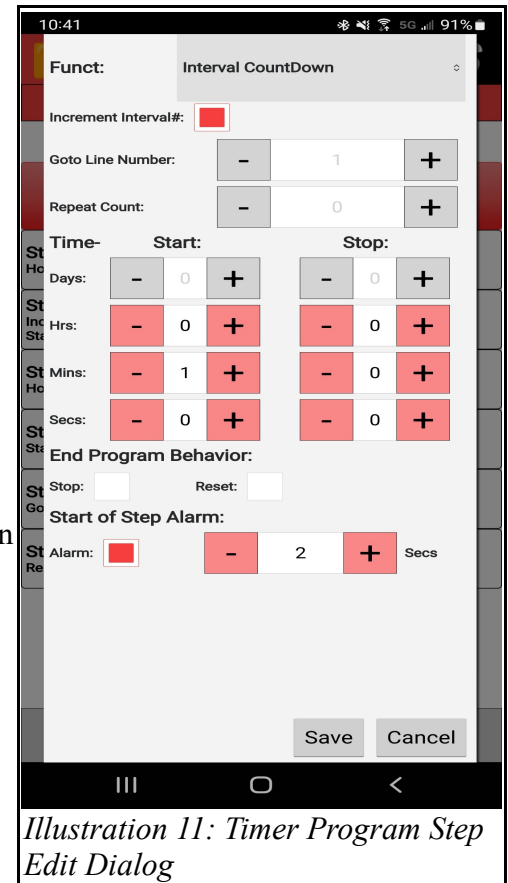


Illustration 11: Timer Program Step Edit Dialog

**Goto Line** – Goto Line provides a looping/repeat function. When set as the active command, the target step number can be set. This should be the step number that the program should jump to. The Repeat Count option sets how many times this step will be executed before it steps through to the next step. This step is useful in setting up Round/Interval count-down sequences. For example two count-down steps could be created, one that counts down from 1 minutes to 0 and increments the Interval number, followed by a second count-down step that goes down from 20 seconds and doesn't increment the interval number. The next statement could be a Goto that goes back to the first step and is allowed to run 3 times, making a timer that has three workout periods followed by three rest periods. After the third time the Goto was reached, it would pass through to the End Program step and the clock would resume its normal time display.

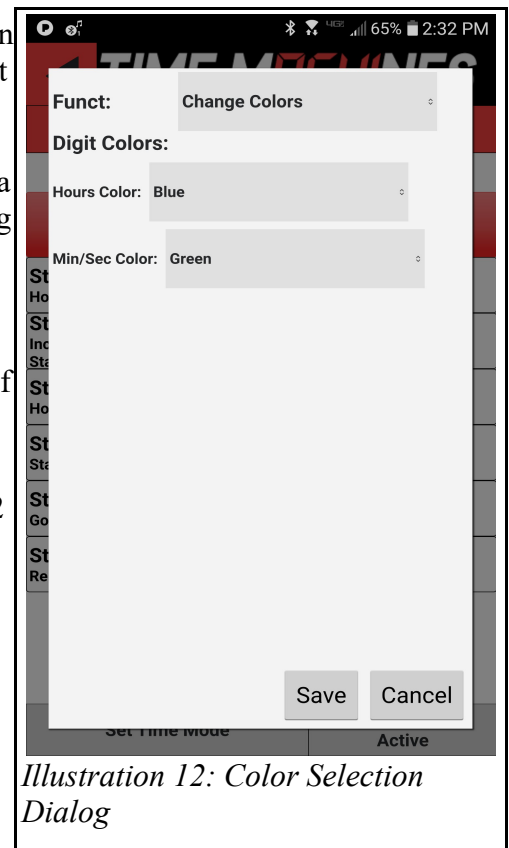
**End Program** – This is the final step of the program. When execution of the program gets to this point, the program will end and the display will return to its default time/calendar setting.

**End Program Behavior** – A new feature added in POE 5.2 and WiFi 3.2 is a control to determine what happens to the clock display when the currently running program ends. Previously, by default, the clock would immediately return to time display mode when a program ended. The two new checkbox options allow the program to automatically Reset to the beginning, or stay with whatever was on the display when the program ended. This of course assumes the program does have an end. A count-up timer will run forever if no stop point is assigned such that the program never actually ends.

**Change Color** – This program step is used to change the color of the display, as supported by the RGB displays. The RGB displays have the ability to separately set the colors for the Hours digits and the Minutes:Seconds digits. This is very useful in Interval timing when highlighting the round number separately from the time left in the round is desired.

#### 4.10 Exit Application

This probably doesn't need much additional explanation. Try it and see what happens...



*Illustration 12: Color Selection Dialog*

## 5 Example Programs

### 5.1 Tabata Timer

This section walks the user through creating a simple Tabata timer for exercise purposes. An infinite number of unique programs can be created. An example Tabata timer, with color changes, is stored in the first program of TM-Timer. The steps shown here are equally applicable to the TM-Manager computer application.

**Step 1** – Pick an empty program space on the programming screen and add five additional program steps. Call it Tab 60/15 or something that means something to you. It should look like the Step 1 illustration at the right.

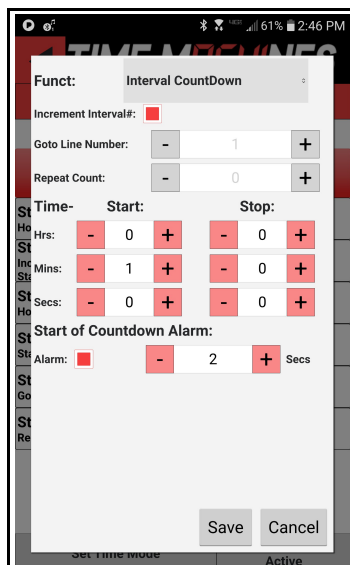


Illustration 14: Step 3-4

**Step 2** – Set the first and third steps as color changes. For the Tabata timer, set the Hours to one color and the Min/Sec color to something different.

**Step 3** – Edit the second step so that it is setup to be an Interval Countdown step. Check the Increment Interval option. Set the Initial Countdown time to be 1 minute, and check the Alarm box and set 2 seconds. This will provide an alarm beep (if a buzzer is installed) at the beginning of the round. It should look like the Step 2-3 illustration. Save this information out.

**Step 4** – Edit the forth step so that it is essentially the same as the previous step, except set the Start Secs to be 15 seconds, and uncheck the Increment Interval number. The alarm should be active which will serve as the end of the previous interval beep. Save this step.

**Step 5** – Edit the fifth step in the program. This will be a Goto Step. It is used to make the program repeat multiple times creating multiple rounds for exercise and rest. The Goto Line Number should be 1, which is the first step of the program. The Repeat Count is set to 5 in this example. This will result in 5 30 second exercise rounds, followed by 10 second rest intervals.

**Step 6** – Edit the sixth step, leaving the step as an End program, but check the alarm and set it to 2 seconds. This makes sure there is an end of workout buzzer when the program finishes the 5 round rest period. When done, the program screen should look like the Step 6 illustration.

This program can now be sent to any selected displays by pressing the Reset Button and then started by clicking the Start button.

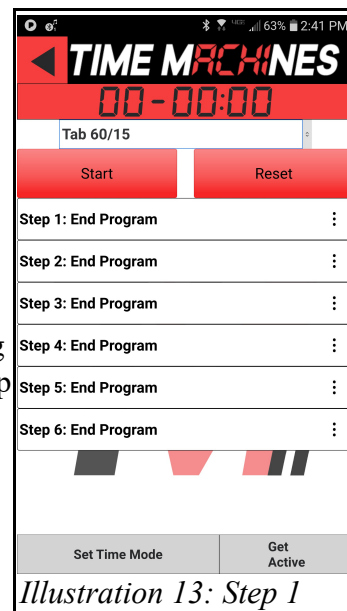


Illustration 13: Step 1

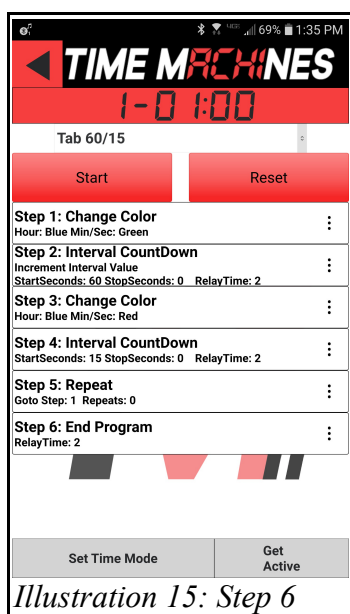


Illustration 15: Step 6

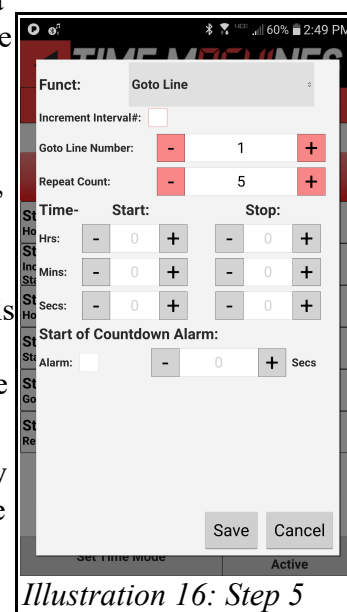


Illustration 16: Step 5



## 5.2 Passing Period / Break-Lunch Timer – Alarm Activated Programs

Starting in version 2.0 of TM-Manager / TM-Timer is the ability to create up to 10 stored timer programs. Instead of only supporting one 5 minute passing period timer, additional countdown programs can be stored to support, for example, 10 minute break periods, 30 minute lunch periods, and a 5 minute passing period if desired (king of mixing use cases there!). It represents a significant increase in flexibility to trigger multiple stored programs at programmed times throughout the days.



Illustration 19: Step 1

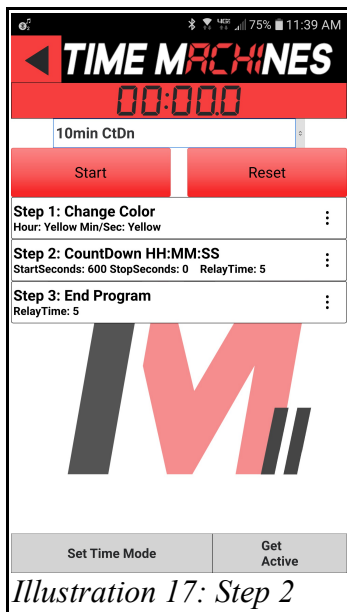


Illustration 17: Step 2

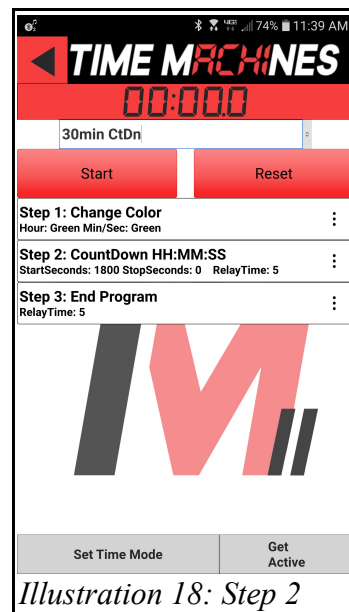


Illustration 18: Step 2

**Step 1** – Create a timer program in program space 3, call it 5min CtDn, of the app and set it up initially with two steps. The first step should be a standard count-down timer that starts at 5 minutes, set the alarm to sound for 5 seconds. This alarm serves as the start of the passing period. The second step in the program will be the end of program step, but include an alarm that sounds for 5 seconds. This alarm serves as the end of the passing period. The program should look like the program in the Step 1 illustration. If an RGB display is used, adding a color change to the start of program can be a nice visual cue as well. The program examples show this step included.

**Step 2** – Create two more programs, in program space 4 and 5 and call them 10min CtDn, and 30min CtDn respectively. They should be same as the Step 1 program and be for 10 minutes and 30 minutes each. Pictures of each of these programs are shown in the figures.

**Step 3** – From the Main Screen, select whichever displays will store and execute the programs, and select “Save All Programs” from the menu. This will send all 10 programs stored in TM-Timer / TM-Manager application to the selected clock(s). It will overwrite any other programs that are stored on the clock. Once stored on the display, the entire set of 10 programs can always be recalled from the display to the TM-Timer / TM-Manager applications, name and program included.

Keeping track of the program and the location it is stored in program space of the clock is a fairly manual process. It is from this position in the list of 10 programs that the clock is told which program to execute in the alarm setup of the displays.



**Step 4** – Setup the Alarms in the clocks. The Alarm page for the clocks should look similar to the web page setup in the Step 4 illustration. The key to this working correctly is setting the times in 24hr mode, and setting the duration to “PX”, where X is 3, 4, or 5 in this example. This causes the clock to run the program saved in Steps 1&2 at the time indicated in the alarm setup. TM-Manager can be very useful for setting up alarms across multiple clock displays since it can store 5 unique display alarm schedules and can populate those difference schedules to multiple clocks at a time. TM-Timer does not support alarm editing.

Once these steps are completed, all clocks with the timer program saved in them, and the alarm settings made, the respective 5, 10, and 30 minute count-downs will occur at the specified times. Hopefully everybody gets to class / lunch/ break on time!

**TIME MACHINES**  
Time Machines® Alarm Configuration

Main Settings

☒ Show Events 21-40

Event	Enable	Start Time (HH:MIN:SEC)	SUN	MON	TUE	WED	THR	FRI	SAT	Duration (sec)
1	<input checked="" type="checkbox"/>	8:55:0	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	P3
2	<input checked="" type="checkbox"/>	9:55:0	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	P3
3	<input checked="" type="checkbox"/>	10:30:0	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	P4
4	<input checked="" type="checkbox"/>	10:55:0	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	P3
5	<input checked="" type="checkbox"/>	12:0:0	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	P5
6	<input checked="" type="checkbox"/>	12:55:0	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	P3
7	<input checked="" type="checkbox"/>	13:55:0	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	P3
8	<input checked="" type="checkbox"/>	14:30:0	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	P4
9	<input checked="" type="checkbox"/>	14:55:0	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	P3
10	<input type="checkbox"/>	12:0:0	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	5
11	<input type="checkbox"/>	12:0:0	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	5
12	<input type="checkbox"/>	12:0:0	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	5
13	<input type="checkbox"/>	12:0:0	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	5
14	<input type="checkbox"/>	12:0:0	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	5
15	<input type="checkbox"/>	12:0:0	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	5
16	<input type="checkbox"/>	12:0:0	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	5
17	<input type="checkbox"/>	12:0:0	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	5
18	<input type="checkbox"/>	12:0:0	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	5
19	<input type="checkbox"/>	12:0:0	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	5
20	<input type="checkbox"/>	12:0:0	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	5

Save Settings Restart

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Illustration 20: Step 4

## 5.3 Presentation Timer Program – Color Changes Mid Time

The presentation timer program, which has a shortcut available in both TM-Timer and TM-Manager, shows a new feature starting in version 2.0 of both Timer and Manager applications. Its function is described elsewhere, but essentially it is a count-down timer that changes colors at specific times during its count-down to alert the presenter/speaker that their time is nearly up.

The specific new feature that this example will illustrate is the ability to have a timer program count up/down step stop counting at some point during the steps execution to allow for some other event to occur. Specifically count up timer steps are now able to start a particular preset time that is not zero. Count down timer steps can be programmed to stop at a programmed time before reaching zero. This can be useful for causing a relay closure at some point during the count up/down, or to change colors on an RGB capable display. The full RGB presentation time program example appears in the illustrations to the right.

Walking through the programs, the first step is to set the color to green. A color set essentially takes no time and Step 2 being a count-down starting at 5 minutes (StartSeconds=300). However, at 1 minute, the count-down is instructed to stop (StopSeconds=60).

Step 3 changes the color to Yellow, alerting the presenter that their remaining speaking time is coming to an end. In Step 4, the count-down starts at 60 seconds and ends at 0. Because the only thing between Steps 2 and 4 is the Step 3 color change, the actual count-down appears to proceed without interruption and the only visual change is the color changing to yellow with 1 minute remaining.

Step 5 is another color change to red and Step 6 immediately begins a count-up starting at 0 and running indefinitely. The moderator, who theoretically is controlling the display(s), can then stop and reset the timer as required for the next presenter.

This program illustrates several new features incorporated in the latest release of TM-Timer / TM-Manager. Older, non-RGB clocks, with upgraded firmware, will also support the new timer start / stop features, but of course not the color changes. The older clocks will know what the color change steps means, but simply ignore it.

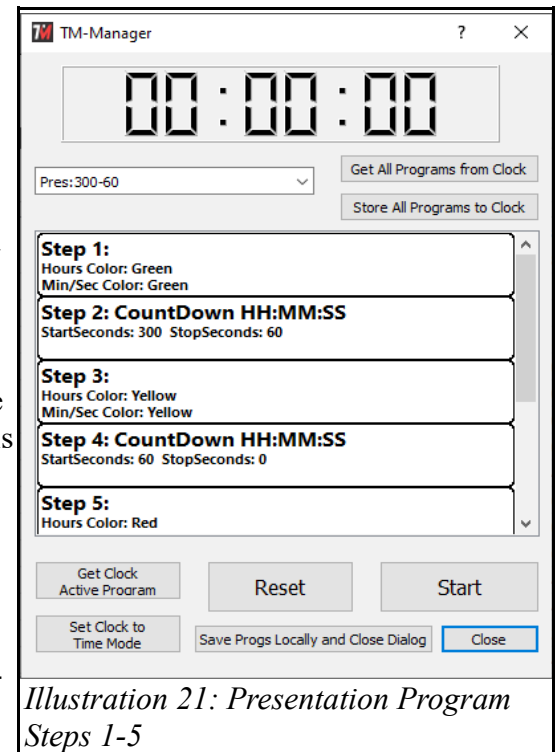


Illustration 21: Presentation Program Steps 1-5

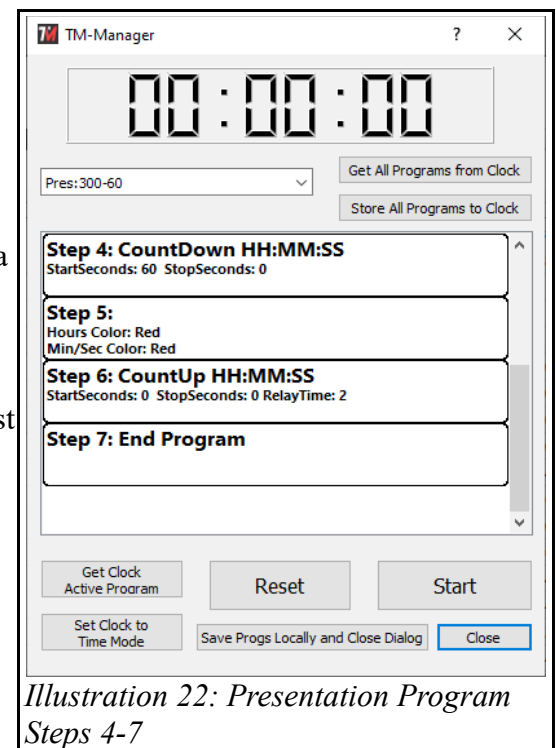


Illustration 22: Presentation Program Steps 4-7